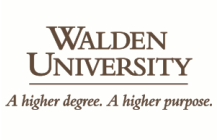

2015

Examining School Culture and Resources as Predictors of the Implementation of Evidence-Based Intervention

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This is to certify that the doctoral dissertation by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
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Walden University
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Abstract

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MA, Adelphi University, 2002

BS, John Jay College of Criminal Justice, 2000

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Psychology

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Abstract

There is a lag in implementation of evidence-based interventions (EBI) in public schools in the United States. This lag creates a gap between what has been scientifically supported and what has also been implemented in school settings by special education teachers and school psychologists. The purpose of this quantitative study was to determine if consultation and professional development resources and 2 elements of school culture (school climate and school characteristics) predict the implementation of EBIs. The study tested 7 potential predictor variables: professional development, consultation, school climate, inclusive characteristic, exclusive characteristic, bureaucratic characteristic, and adhocratic characteristic. Survey data from 137 middle school special education teachers and psychologists were analyzed using stepwise multiple linear regression analysis. Notable findings included that consultation accounted for 11% of the variance of EBI frequency alone, professional development accounted for 9%, and both combined accounted for 16%. Similarly, consultation accounted for 11% of the variance of implementation duration, professional development accounted for 8%, and both combined accounted for 15%. This study promotes positive social change through identifying ways for school administrators to increase school personnel's EBI implementation behavior: by investing in professional development and investing in consultation. Investments in these resources is predicted to improve school staffs' ability to better meet the complex educational needs of students with autism in least restrictive environments.

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Dedication

I dedicate this work to my husband and three children who have supported me on this wonderful journey of exploration. Without their support and encouragement, I would not have had the strength or motivation to see it through.

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Chapter 1: Introduction to the Study

Introduction

Educating children with disabilities in the general education, middle school setting has become an increasingly common occurrence in the United States, since the release of the No Child Left Behind (NCLB) Act of 2001 (U.S. Department of Education, 2013) . This change is due to federal education law that now guarantees students with a disability a free and appropriate public education in the least restrictive environment possible and opportunities for integration with nondisabled peers (U.S. Department of Education, 2013). This presents special education teachers and school psychologists with an enormous task, and raises the question of whether schools and educators are equipped to support these students' educational needs. Educating children with autism spectrum disorder (ASD) presents educators and support staff with a myriad of complex challenges requiring specialized knowledge, skills, and support. Autism is characterized by marked impairments in behavior, socialization, and communication; its pervasive nature affects all aspects of learning and education (American Psychiatric Association, 2013).

School districts employ a variety of human and financial resources to address the unique needs of children with autism and to provide them with evidence-based autism interventions. The No Child Left Behind Act of 2001 (NCLB) stipulated the use of evidence-based interventions as a safeguard to protect disabled students from treatments that have little to no scientific validity (U.S. Department of Education, 2013). As a result, school districts often enlist the services of specialized behavior consultants (Gravois, 2012), and/or procure professional development and training for their staff (Leblanc,

Richardson, & Burns, 2009; Probst & Leppert, 2008). Recent research has shown that evidence-based interventions (EBI) in special education programs are lacking (Burns &Ysseldyke, 2009; Sansosti & Sansosti, 2013). There appears to be a disconnect or gap between what has been identified as scientifically supported interventions recommended for use when working with individuals on the autism spectrum and what is being implemented in the public school setting by special education teachers and school psychologists.

This study addressed this research gap mentioned by developing a multiple regression equation that predicted evidence-based intervention implementation, as suggested by Mertler and Vanatta (2005). Predictor variables related to implementation practices have been studied in isolation (Morrier, Hess, & Heflin, 2011). This study used a combination of predictor variables to establish a regression equation to predict evidence-based interventions. The predictor variables used included consultation, professional development, school climate, inclusive characteristic, exclusive characteristic, bureaucratic characteristic, and adhocratic characteristic. The predictor variables will be discussed in greater detail in Nature of Study and Chapter 3.

This chapter describes the organizational and cultural context required for successful program implementation of evidence-based interventions in the public school setting. It also explores potential barriers to implementing these interventions in the school setting using the perspectives of special education teachers and school psychologists.

Background

This study examines the U.S. public school system's middle school environment, which constitutes a scene and system in which evidence-based intervention for ASD-diagnosed students commonly takes place. School characteristics and culture are two elements which contribute to the environmental context, and are affected by political and personal factors. These factors may impede the ability of middle school professionals to integrate new evidence-based interventions into their repertoire to service autistic students. Organizational adoption of innovative interventions in educational settings, such as adopting evidence-based autism interventions, is a difficult and progressive process. The execution of any new process or technique by school professionals requires that favorable conditions exist at both the level of intervention and system of implementation (Domitrovich et al., 2008).

These difficulties require a combination of conditions for a successful autism-related intervention in a school setting. Ideally, an intervention is endorsed by the autism community, accepted by the administration, and both cost-effective and sustainable over time (Boudah, Logan, & Greenwood, 2001). Evidence-based interventions that do not carry the support of the educational administrators who are expected to promulgate them generally fail to proliferate in school systems (Domitrovich et al., 2008). Similarly, an innovation that does not have individual support from school personnel such as special education teachers and school psychologists often is not successfully adopted. Staff who are resistant to change or are not trained or encouraged to implement evidence-based interventions are less likely to apply new strategies. Leadership and teacher commitment

has a significant and direct impact on implementing new program practices in the school setting (Boudah, Logan, & Greenwood, 2001). Social validation of new treatments and controversy surrounding what constitutes evidence-based autism interventions have also been found to be obstacles to quality implementation (Callahan, Henson & Cowan, 2007; Odom et al., 2005; Simpson, 2005). Diffusion of the intervention, the manner in which new ideas and practices are communicated and circulated within a social system, does not occur in a vacuum but within the context of the school organization (Rogers, 1995). This hypothesis is supported by Domitrovich et al.'s (2008) assertion of the strong relevance of school climate and organizational health to a school's ability to accept changes in practice. These factors suggest that an organizational environment characterized by positive school culture, and bureaucratic leadership style should theoretically support evidence-based intervention implementation.

Failure to implement evidence-based autism interventions has significant, negative consequences for students, staff, and school districts. According to Simpson (2005), using intervention methods that do not have a demonstrated effectiveness can hinder learning, regress skills, and exacerbate negative behaviors. Simpson (2005) also noted that the personal safety and well-being of school personnel can become compromised as a result of improper behavior management techniques, making burnout more likely. Moreover, school districts can become vulnerable to litigation subsequent to improper management of students with disabilities under federal education legislation.

Problem Statement

There is a lag in implementation of evidence-based autism interventions in the school settings in the United States. School culture can affect how school professionals perform their job (Carroll et al. 2011; Symes & Humphrey, 2011). This suggests that if special education teachers and school psychologists are properly trained and given the resources necessary to implement EBIs that have been scientifically proven to be effective in improving skill acquisition and ameliorating challenging behavior, these professionals will implement these evidence-based interventions with fidelity at a high frequency. This breakdown in implementation may negatively affect student gains by wasting valuable time using methods that are not empirically supported, or even worse detrimental. Additionally, school professionals who do not apply effective strategies to manage challenging and potentially aggressive behaviors jeopardize their own physical safety. This study was designed to address this by examining resources and school culture as predictors of school professionals' implementation of evidence-based interventions.

According to a 2010 survey by the Center for Disease Control, one in 68 children are diagnosed with Autism Spectrum Disorder (Centers for Disease Control and Prevention, 2012). Of those students between the ages of 6-21 years, 90% in 2009 were educated in regular (non-residential) schools in the United States (U.S. Department of Education, National Center for Education Statistics, 2012). Under federal education mandates such as the Individuals With Disabilities Education Act (IDEA) of 2004 and the No Child Left Behind (NCLB) Act of 2001, the use of evidence-based practices is required when working with students with disabilities (U.S. Department of Education,

2013). Failing to implement evidence-based interventions makes a public school district vulnerable to costly litigation. Consequences for not implementing evidence-based intervention, in the form of legal action, have also been discussed (Yell, Katsiyannis, Drasgow, & Herbst, 2003). This study was designed to examine the context in which evidence-based intervention is normally carried out to confirm whether or not certain factors affect implementation practices.

Although evidence-based interventions from different perspectives have been examined in previous studies, no previous research has used a regression equation to determine if resources and culture can predict evidence-based intervention implementation by special education teachers and school psychologists (Sansosti & Sansosti, 2013). There is an abundance of qualitative research exploring school culture, professional development, and perceptions of evidence-based interventions, but limited quantitative inquiries examining select variables related to the use of evidence-based interventions by school personnel. This study was designed to address this gap in the literature.

Purpose

The purpose of this quantitative study was to develop an equation to predict if resources and school culture could be used to predict the implementation of evidence-based interventions. The specific resources examined were consultation and professional development; the specific elements of school culture examined were school climate and school characteristics. This study was specifically designed to determine how resources and school culture relate to implementation practices, so as to guide school administrators

charged with securing professional development, allocating, funds, and making administrative and student placement decisions. The predictor variables in this study were consultation, professional development, school climate, inclusive characteristic, exclusive characteristic, bureaucratic characteristic, and adhocratic characteristic. The criterion variables in this study were implementation duration and implementation frequency of evidence-based interventions.

Research Questions/Hypotheses

This study used two primary research questions crafted according to the literature review findings. Research Question #1 asked:

Which of the possible seven predictor variables (professional development, consultation, school climate, inclusive characteristic, exclusive characteristic, bureaucratic characteristic, and adhocratic characteristic) are included in a regression equation for predicting frequency of evidence-based intervention implementation?

$H_{01:}$ Resources and culture will not predict the frequency of evidence-based intervention implementation, as measured by: the number of annual continuing education and professional development hours completed specific to evidence-based autism interventions; number of monthly hours of expert consultation received; score on the Organizational Health Inventory; school characteristics as categorized by the respondent; and frequency of time spent engaging in autism specific evidence-based interventions weekly.

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and professional development hours completed specific to evidence-based autism interventions; number of monthly hours of expert consultation received; score on the Organizational Health Inventory; school characteristics as categorized by the respondent; and frequency of time spent engaging in autism specific evidence-based interventions weekly.

Research Question #2 asked: Which of the possible seven predictor variables (professional development, consultation, school climate, inclusive characteristic, exclusive characteristic, bureaucratic characteristic, and adhocratic characteristic) are included in a regression equation for predicting duration of evidence-based intervention implementation?

$H_{01:}$ Resources and culture will not predict the duration of evidence-based intervention implementation, as measured by: the number of annual continuing education and professional development hours completed specific to evidence-based autism interventions; number of monthly hours of expert consultation received; score on the Organizational Health Inventory; school characteristics as categorized by the respondent; and duration of time spent engaging in autism specific evidence-based interventions weekly.

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and duration of time spent engaging in autism specific evidence-based interventions weekly.

Theoretical and Conceptual Framework for the Study

The theoretical frameworks for this study were Rogers' (1995) diffusion of innovation theory and the conceptual framework of Domitrovich et al. (2008). Rogers described how new ideas transfer from research or theory to applied practice in a systematic and predictable manner. Diffusion of innovation theory has been used to explain how technologies, information, and clinical treatments circulate for use by a number of professional fields, and was selected to highlight impediments to intervention implementation. Rogers'(1995) theory may provide insight into how evidence-based intervention permeates the school setting and translates into use with students diagnosed with autism spectrum disorder. The work of Domitrovich et al. (2008) was a three-tiered exemplar for understanding the complex nature of intervention adoption within the school organization. The framework was used to identify factors at the macro, school, and individual level which hindered or supported the quality of evidence-based intervention implementation.

Nature of the Study/Methodology

The nature of this study was quantitative. Multiple regression analysis was used to see if resources and school culture could predict implementation of evidence-based interventions. The seven predictor variables fell into two general categories: resources and school culture. The breakdown of categories was as follows: resources included professional development and consultation; school culture included school climate,

inclusive characteristic, exclusive characteristic, bureaucratic characteristic, and adhocratic characteristic.

Professional development was defined as opportunities to learn, enhance, and practice autism specific evidence-based interventions, and is operationally defined as number of hours engaged in autism-specific professional development annually. Consultation was defined as the availability of access to expertise and support from those identified as being specialists in the field, and is operationally defined as the number of hours provided with expert autism consultation monthly. Both professional development and consultation were continuous variables.

School culture was divided into five categories; school climate, inclusive characteristic, exclusive characteristic, bureaucratic characteristic, and adhocratic characteristic. School climate was measured using the Organizational Health Inventory (OHI) scale (Hoy & Feldman, 1987), an instrument developed specifically for use with middle schools. The OHI instrument evaluates the overall health of a school based on a multidimensional scale examining relationships between teachers, administrators and students (Hoy & Feldman, 1987). The total score was used for this study, which ranged from 250-740. School characteristics was defined as the overarching and distinguishing administrative regime, and classified by the respondents as inclusive, exclusive, bureaucratic or adhocratic. An inclusive culture was characterized by positive attitudes and acceptance held for students with autism, and administrative support for special education programs within general education schools, where exclusive characteristics were comprised of negative attitudes and isolation (Symes & Humphrey, 2011). A

bureaucratic culture was characterized by the institution of policies and practices in place to direct the use of evidence-based autism interventions (Aaron, 2005), where adhocratic sought to problem-solve the challenges of educating and managing autistic children in a more reactive fashion. These predictor variables were categorical and were transformed into dummy variables, as suggested by Field (2009, p. 253-254).

The two criterion variables were implementation frequency and implementation duration, of evidence-based interventions, defined by Aaron (2005) as "interventions with empirical support for their efficacy and/or effectiveness" (p.255). Evidence-based interventions included antecedent-based, behavioral-oriented, discrete trial teaching, naturalistic, peer-modeling, and story-based interventions, and were operationally defined as the frequency, and duration with which they were implemented with students with autism weekly. Frequency was measured in the number of days each week the professional engaged in evidence-based practice. Duration was measured as the number of hours engaged in evidence based practice per week. These were treated as continuous variables, and are summarized in Table 1.

Multiple linear regression was the method of analysis used to test my hypotheses. Multiple regression is a statistical method used for studying the relationship between a single criterion variable and one or more predictor variables. It was used in this study to examine whether the select predictor variables alone or in combination could account for the changes in the criterion variable. It can be used to predict how one variable will change in relation to changes in another based on their values if the strength of the predictors are found to be sufficient (Mertler &Vanatta, 2005). My objective was to use

the gathered data to construct a regression equation using seven predictors discussed earlier to predict evidence-based practices.

A nonexperimental cross-sectional survey design was selected based on current social science research involving evidence-based interventions, staff professional development, and school culture (Burns &Ysseldyke, 2009; Sansosti &Sansosti, 2013; Yeunjoo, Patterson, & Vega, 2011). A nonexperimental survey design was selected, as this study did not involve an active intervention, and data was collected at only one point in time. Creswell (2009) supported the use of survey methods for use when examining variables that affect intervention results, and when assessing intervention efficacy. This study sought to examine the predictive relationship among select predictors by gauging the utilization of evidence-based interventions thus making it suitable for the proposed strategy of investigation.

Definitions

Adhocratic: A structureless organization characterized by its collaborative approach and ability to problem-solve using innovative methods to address student needs in a positive way (Skrtic, 1991).

Autism Spectrum Disorder(ASD): A neurological disorder typically diagnosed in early childhood and characterized by core deficits in behavior, communication, and social skills (American Psychiatric Association, 2013).

Duration: In the context of this study, the amount of time recorded as spent engaged in evidence-based practice implementation per week, as measured in hours.

Evidence-based Interventions (EBI):"interventions with empirical support for their efficacy and/or effectiveness" (Aaron, 2005, p.255). Examples of evidence-based interventions include antecedent-based interventions, applied behavior analytic instructional practices, discrete trial teaching, incidental teaching, errorless teaching, shaping, modeling, and naturalistic teaching, as endorsed by the National Autism Center (2011).

Free Appropriate Public Education(FAPE): A right guaranteed to all students with disabilities in the United States under the Individuals with Disabilities Act of 2004 (U.S. Department of Education, 2013).

Frequency: In the context of this study ,the amount of time recorded as number of days spent engaged in evidence-based practice implementation per week.

*Individuals With Disabilities Education Act of 2004 (IDEA):*A U.S. federal education law that protects the rights of students with disabilities and provides guidance for schools on how to meet the educational needs of students with disabilities inclusive of related service provision and accommodations (U.S. Department of Education, 2013).

Least Restrictive Environment (LRE): A requirement of the Individuals with Disabilities Education Act that stipulates that students with disabilities be integrated with nondisabled peers to the greatest extent feasible (U.S. Department of Education, 2013).

Middle school: In the context of this study, middle school refers to grades 7 through 9, or for ungraded students with disabilities, middle-school students are those between the ages of 11 and 13.

*No Child Left Behind(NCLB):*A federal education reform law that stipulates that evidence-based interventions be used in the school setting to address student academic and behavioral needs (U.S. Department of Education, 2013).

School climate: The perceived quality of the school setting (Adelman & Taylor, in 2005, p.1).

School culture: An all-encompassing term used to describe the context or organizational norms and values in which education occurs (Macneil, Prater, & Busch, 2009).

Assumptions

There were several assumptions of this study. The first assumption was that the participants would answer the questions regarding their implementation practices honestly and accurately. The second assumption was that the respondents characterize the school climate and characteristics in which they work objectively and free from personal bias. Third, it was assumed that the special education teachers and school psychologists completing the question sheet were knowledgeable of evidence-based interventions, and their use with students on the autism spectrum. Lastly, it was assumed that the results of the study would generate a predictive equation that could be used to predict implementation behavior of other professionals.

Scope, Delimitations, and Limitations of Study

A quantitative approach, with a survey method of inquiry was used to collect and analyze the data for statistical analyses. The OHI-M instrument required that respondents rate the occurrence of characteristic statements from “rarely occurs to very frequently

occurs", and may have been highly subjective. The respondent's possible responses to the additional information questions asked, found in Appendix C, were along a continuous scale or categorical, and may not have been an accurate depiction of their opinions. The scope of this quantitative study was to examine the predictive ability of resources and culture on the professional's implementation of evidence-based interventions. It is possible that there were additional confounding variables effecting evidence-based intervention implementation that were not identified or explored during the course of this study.

This study was limited by the recruitment procedure, as it was possible that those registrants that allowed themselves to be contacted through the Counsel for Exceptional Children were not representative of those who choose not to make their contact information public. The OHI instrument was presented on paper and pencil plus a number of questions, which are listed in Chapter 3 and found in Appendix C. The delivery method was the United States Postal Service, which may not have appealed to those too busy to take the time out to complete and return the survey. Lastly, given the size of the sample it may not likely produce data that will easily generalize beyond the scope of the sample.

This study was limited by the sampling procedure employed. A nonrepresentative convenience sample was used to target a small subset of professionals who work with autistic middle school students in the public school setting. The ratio of special education teachers to school psychologists who responded were disproportionate, and do not reflect all members of the profession.

Significance of the Study

The results of this study shed light on factors that predict the use of evidence-based interventions in the public middle school setting. It also offers school administrators feedback that may shape the way they approach planning to bring autistic students back to district from private placements, and approach their administrative role. While the aim may be to provide disabled students a Free Appropriate Public Education (FAPE) in the Least Restrictive Environment (LRE), the question, "are we equipped to provide for their needs?", requires careful consideration. Supporting the educational needs of children with disabilities is a challenging endeavor. Educating students who display exigent emotional and behavioral difficulties characteristic of autism spectrum disorder further tax the very resources in place to support them. The use of evidence-based interventions is advocated for its demonstrated effectiveness and positive outcomes, and requires school professionals adapt to changing times and integrate new interventions into their repertoires (Magiati, Tay, & Howlin, 2012).

Summary

Chapter 1 focused on some of the obligatory conditions necessary for successful implementation of evidence-based interventions within the context of the school organization, as well as potential barriers to implementation.

The significance of this quantitative study is that is adds to the empirical body of inquiry in special education for middle school students with autism spectrum disorder, and provides school administrators with a gauge of the practical applications of educational legislation directives.

Chapter 2 will provide a literature review on the adoption and implementation of innovative practices, evidence-based autism interventions, school personnel preparation, training, and support, autism and education, school culture, and barriers to implementation .Chapter 3 describes the methodology employed to conduct the study. Chapter 4 describes the data analysis conducted. Chapter 5 provides a summary of the data, interpretations, significance of findings, and future recommendations.

Chapter 2: Literature Review

Introduction

There is a lag in implementation of evidence-based autism interventions in public school settings in the United States. The purpose of this study was to help investigate a gap in research on this lag; it specifically examined the predictive ability of selected factors related to implementation of evidence-based interventions among professionals working with autistic middle school children.

This chapter begins with the selected theoretical and conceptual frameworks. This is followed by sections discussing adoption and implementation of innovative practices, evidence-based autism interventions, school personnel preparation, training and support, education and autism, school culture, and barriers to implementation. The chapter concludes with a discourse on how this research contributes to the field of educational psychology. Throughout the literature review current research that both supported and challenged the research questions were highlighted, as well as those that justified the continued exploration of evidence-based intervention implementation in schools.

A thorough review of the literature was conducted using the following web-based search engines: ERIC (Educational Resources Information Center), Psych INFO, PsychARTICLES, Google Scholar, and ProQuest Dissertations and Theses. The Walden University online library was the primary resource utilized. Key search terms and phrases included: evidence-based autism interventions, innovation in autism education, autism and special education, school consultation, teacher training, school culture and special education, and research to practice. Books were obtained by conducting a literature

search within the library catalogue database using the same search terms. Additional resources were obtained by searching the references from relevant articles. The scope of the literature review spanned1982 to 2013, with the greater part of literature being published between 2005 and 2012. The articles referenced in this review were carefully selected for their relatedness to the theoretical framework and their procedural similarities.

Theoretical Foundation

Diffusion of Innovation

This study used Rogers' (1995) diffusion of innovation theory as its theoretical foundation. This theory has consistently been cited as the theory of choice for social scientists looking to explain how new and innovative ideas or technologies translate from research theory to applied practice. Rogers stated that "diffusion is the process by which an innovation is communicated through certain channels over time among members of a social system" (Rogers, 1995, p.5).Diffusion of innovation theory assumes that there is an established and structured organization of members, and that information is effectively transmitted or conveyed among its members. This theory has previously used to explore why autism interventions are not implemented with fidelity in the educational system (Dingfelder & Mandell, 2010), a usage similar to that in this study. It has also been used to shed light on obstacles impeding propagation of pediatric mental health programs (Leadbeater, 2010).

Rogers (1995) suggested that the speed at which a new innovation is implemented is determined by the advantages the innovation presents over the model that it is replacing, and on its ability to meld with the current system in place. A new value system may need to be embraced in order for incompatible innovations to be adopted, which may in turn affect intended timelines for execution. The acceptance of new innovations has been described as a bell curve, in which very few people adopt innovations right away or are the very last to accept and implement it (Rogers, 1995). According to Rogers, the goal of innovative diffusion is the institutionalization of new practices through permeation throughout the organization reaching the masses. Furthermore, tactical planning on the part of the imposer of new interventions should focus on targeting and persuading the opinion leaders of the group. Providing adoptees with sufficient information on the advantages and disadvantages of an innovation reduces their anxiety caused by the uncertainly of innovations' consequences, thereby increasing the likelihood of their adoption.

Rogers' (1995) innovation theory was best suited for this study because it shed light on teacher and psychologist adoption of evidence-based autism interventions. It provided a mechanism to explain why despite empirical support, federal education regulation, risk of litigation, and increased odds of student harm, special education teachers and school psychologists continue to lag in the implementation of evidence-based interventions for students with autism.

In developing this study, cognitive behavioral theory was the first of three theories considered. The basis for this was a hypothesis that the cognitions, or thoughts,

of the special education teachers and psychologists were affecting their implementation of EBIs due to feelings of being ill-prepared or lacking confidence. An alternative considered was social learning theory, which could have explained how the dynamics of the schools' social environment were affecting the implementation rate of evidence-based interventions. Lastly, behavior theory was considered to explain the teachers' and psychologists' task avoidant behavior. Rogers' theory was selected to the exclusion of the others because it focused more precisely on how new practices diffused within a structured organization, lending consideration to both the individual and macro systems at play. The skepticism inherent in accepting new ideas may be amplified by the politics of the school setting. The research questions posed in this study related to Rogers' theory in that they connected implementation practices to the climate and other characteristics of the school.

Background

The research-practice gap has historically been approached by researchers from an intervention-centered perspective. Significant consideration has been given to identifying interventions that demonstrate empirically successful outcomes for students with autism, highlighting teachers' awareness and use of different types of evidence-based interventions, and examining the effects of teacher training programs. Much of the identified literature presented strong empirical support for the importance of professional development and training in the use of EBI's to teach new skills and address problem behavior, and validated the use of consultation as a resource.

School culture has long been examined within the context of general education and currently elicits significant research interest related to special education. With an increasing trend of integrating students with disabilities into the general education setting, the body of literature on inclusion and best practices has grown, since the first release of the Individuals With Disabilities Act in 1990. There was a disproportionate trend favoring qualitative inquiry during the course if this study. For example, one finding noted that school culture could both support or impede the ability of school personnel to meet the needs of their students with autism (Symes & Humphrey, 2011); however, this research was limited in its ability to transfer findings from the teaching assistants studied to the special education teachers and school psychologists targeted by this study. Teaching assistants have not received comparable training and lack experience that certified teachers and psychologists possess. The perceived social validity of an intervention, which may be reflective of the school culture, was found to be indicative of its implementation (Callahan, Hensen, & Cowan, 2008), and positive school culture was found to facilitate innovative diffusion (Domitrovich et. al., 2008).

Adoption and Implementation of Innovative Practices

The acceptance, adoption and implementation of new programs, interventions, and ideas is a slow and arduous progression. The rate of acceptance can be influenced by a myriad of factors on the individual, school, and macro levels (Domitrovich et al., 2008; Rogers, 1995). A breakdown can occur at any level or stage of implementation, such as with the research-to-practice gap examined in this study

At the individual level the school personnel may possess personality characteristics which are not compatible with innovative practices. Traits believed to impede adoption included resistance to change, complacence, indolence, and fear. Koegel, Matos-Freden, Lang and Koegel (2012) suggested that school personnel may have negative preconceived ideas about the evidence-based interventions, which can affect their implementation. One such behavior analytic method is the use of positive reinforcement. Some may hold the opinion that appropriate student behavior is expected, and do not see the value in reinforcing it, or they may disagree with the premise altogether and view it as "bribery" (Koegel, Matos-Freden, Lang, & Koegel, 2012). Another behavior analytic example is the use of modified presentation, mode or duration, which some view as negotiating with a student; however, it can be an effective means of meeting the same educational objective through a different medium. Based on the premise that not all students learn the same way, autistic students are no different in this regard.

Burns and Ysseldyke (2009) surveyed 174 teachers and 333 psychologists on their implementation practices. A Friedman nonparametric test was conducted ranking the evidence-based instructional strategies used by special education teachers, $\chi 2(df= 7, n = 164) = 341.55$, $p < .001$, and by school psychologists$\chi 2(df= 7, n = 322 = 819.18$, $p < .001$. The results indicated that special education teachers and school psychologists were aware of evidence-based interventions, and the majority implemented them on a weekly basis; however, the study also confirmed that many continue to utilize interventions demonstrated to be ineffectual when educating students with disabilities (Burns

&Ysseldyke, 2009). Lack of confidence and perception of self-efficacy in their ability to carry out evidence-based interventions was suggested by the literature as an impediment (Lee, Patterson, & Vega, 2011). School personnel must demonstrate commitment and sustained hard work in order to reach the desired goal of quality implementation of evidence-based interventions (Boudah, Logan, & Greenwood, 2001).

There are a number of potential areas of difficulty at the school level ranging from administrative leadership style and politics to matters of funding, all of which can affect implementation. Adhocratic administrative regimes that value innovative programs and encourage collaborative efforts are more apt to bring about change and subsequent adaptation (Skrtic, 1991); however, the institution of school policies that follow a bureaucratic system, which make clear the expectations regarding the use of evidence-based practice implementation through policies in accordance with federal education legislation, set the tone for teachers and psychologists (Domitrovich, et al. 2008).An underlying and recurrent theme in the literature suggested that an inclusive school culture was one which emphasized respect for diversity (Ainscow & Sandhill, 2010). Diversity does not need to be categorized or classified, just accepted. Acceptance of an inclusive philosophy and sensitivity to the needs of students with disabilities is not inherent to the position of building administrator.

Private agencies are often contracted by school districts to provide services, inclusive of consultation and training. These bids for service go before the board of education on an annual or tri annual basis, and must be approved by the board. It is problematic when turnover occurs as a result of the boards' politics. Programs such as

autism classrooms and expert consultation may come to a halt as a result of a loss or change of vendor contract. Starting over again with new providers can be frustrating and disruptive to students and school personnel alike. According to Roger's theory, innovative diffusion occurs over time, and disruptions in service delivery due to provider changes may impede implementation efforts.

School budgets have been negatively affected by the recession, and tax caps have resulted in cuts in educational spending. Funding sources may dry up before an initiative can get off the ground and derail the adoption of innovative interventions (Boudah, Logan, & Greenwood, 2001; Callahan, Henson, & Cowan, 2008; Dingfelder & Mandell, 2011; Rotheram-Borus, Swendman, & Chorpita, 2012). A program's sustainability must be considered and planned for prior to its inception to be successful beyond its startup funds.

On a macro level, social validation of the intervention can prove to be an obstacle. Parents, teachers, support staff, administrators, and the community are all in a position to support or sabotage autism programming in the school setting. Evidence-based autism intervention implementation requires allocation of funds to special education budgets, which may or may not be passed by communities, dependent upon their views of educating the disabled. This may hold particularly true if the cost of the initiative will detract from general education extracurricular activity budgets for sports or music.

The conceptual framework of Domitrovich et al. (2008) describes how the macro, school and individual levels are interconnected and how lack of support in any one of these areas can slow or halt service delivery. Conversely, an organized system

characterized by strong leadership, dedicated personnel, effective communication, and community support should be able to execute program implementation successfully.

The diffusion of innovative practices, as it pertains to behavioral health services, has been said to be heavily affected by leadership acceptance (Budman, Portnoy, & Villapiano, 2003). Administrators may be unlikely to embrace evidence-based practices that possess weak social validity (Callahan, Henson & Cowan, 2008), lack evidence that they supersede the previous treatment de jour, and are too cumbersome or expensive to maintain (Dingfelder & Mandell, 2011). Administrator support or the absence of support have been cited repeatedly in the literature as obstacles to quality implementation (Browder & Cooper-Duffy, 2003; Domitrovich et al., 2008; Macneil, Prater & Busch, 2009). Efficacious intervention implementation is one that school personnel can carry out easily with the few modifications to the current systems and with the present level of resources.

Evidence-based Autism Interventions

Autism Spectrum is a heterogeneous disorder whose presentation manifests itself in a wide-ranging continuum of symptoms. As such there is no one-size-fits-all treatment, and a number of treatment interventions may be appropriate for remediating skill deficits and addressing challenging behavior. Evidence-based interventions are a collection of strategies used for teaching academic tasks, social skills, language, and behavioral expectations. Evidence-based autism interventions differ from experimental autism interventions in that they are empirically supported to demonstrate positive outcomes. They have undergone extensive research validating their use, and are indicated for use

with individuals on the autism spectrum. Conversely, nonevidence-based interventions have either undergone scientific investigation, which confirmed the intervention to be ineffective, lacks scientific inquiry to substantiate efficacy, or worse, has been found to cause harm.

There is some controversy when it comes to the use of evidence-based interventions and what constitutes evidence-based treatment (Carnine, 1997; Odom, Collet-Klingenberg, Rogers & Hatton, 2010). Not all research is created equal, and the application of pseudoscience can be just as detrimental as using nonresearch based methods (Kratochwill, 2012). In fact, an intervention's inclusion in a research article is not sufficient enough to qualify it as evidence-based, and its quality can be subjective (Odom et al., 2005).

There are also varying degrees of classification of evidence-based interventions based on research findings. Simpson (2005) evaluated 33 commonly used autism interventions and organized them into categories based on their alignment with projected outcomes, potential risks, and evaluation criteria. Simpson's four categories were: 1) scientifically based, 2) promising, 3) limited support, and 4) those which were not recommended for use (Simpson, 2005). The National Standards Project, initiated by the National Autism Center, evaluated 38 autism interventions focusing primarily on merit and treatment effects. Many interventions overlapped the two studies; however, The National Standards Project classified interventions as: 1) established, 2) emerging, 3) un-established, and 4) ineffective/harmful (National Center for Autism, 2011).

Odom, Collet-Klingenberg, Rogers, and Hatton (2010) suggested that appropriate intervention selection should be dictated by the goals set forth in the student's individual education plan (IEP). Logistically speaking, one student may have 35 or more IEP goals each year, and there may be up to 15 autistic students in a class; therefore, reviewing the literature, assessing the quality of interventions, and selecting those for use could be difficult (Carnine, 1997). The complexity of choosing the most appropriate intervention may be above the scope of those entrusted to do so.

Also problematic is the lack of consensus as to what constitutes best practices in education as it pertains to educating students with autism spectrum disorder. Generally speaking methodological decisions are left to the individual educator. Although administrators may promote an initiative, the details on "how to" are not necessarily prescribed. Noteworthy was the negative perception of some on the use of evidence-based interventions. Boardman et al. (2005) surveyed 49 elementary school special education teachers on their views and found despite their districts endorsement of specific practices, the majority reported not using them. Deviating from current practices appeared to be a difficult transition for some, supporting the importance of the individual in the diffusion of innovation. Also noteworthy was the accuracy of the perceptions held by those teachers who were in training. Bain, Brown, and Hordan (2009) evaluated the attitudes of 351 student teachers and found that many had endorsed interventions that they had admittedly not been trained in nor had prior knowledge of. The fact that these student teachers may one day become special educators entrusted with selecting and implementing evidence-based interventions raises serious concerns.

There are some students with autism spectrum who are excused from standardized state assessment exams and, instead, are assessed with alternative methods. Herein lies a loophole where the system of checks and balances in special education is weak at best. If a disabled student is not demonstrating progress, it may be assumed that it is because of their disability. The lack of quality implementation of evidence-based practices can easily be overlooked. Callahan, Henson and Cowan (2008) wrote:

> There is not universal acceptance for interventions identified as best practices by respected researchers and experts in autism would seem to indicate a possibly serious deficit in the understanding, acceptance, and use of basic programming components (p. 690).

The time component also could potentially be problematic as there are a number of time constraints inherent to the school setting. Firm union policies may prohibit school personnel from coming in early or staying late for trainings, and staff must be provided their lunch hour. Preparation time to prepare instructional materials and conduct data analysis has been cited as an important component to implementing evidence-based interventions (Boudah, Logan, & Greenwood, 2001; Browder& Cooper-Duffy, 2003; Cook, Landrum, Tankersley, & Kauffman, 2003; Lee, Patterson, & Vega, 2011; Odom, Collet-Klingenberg, Rogers, & Hatton, 2010). Furthermore, students with autism are frequently pulled out of class for speech, occupational therapy, or physical therapy services, thereby missing valuable instructional classroom time. It is conceivable that there may simply not be enough time in the day to implement evidence-based interventions with fidelity.

Education and Autism

The educational options available for students with autism spectrum disorder vary from state to state and are largely dependent upon the severity of the students' needs. In New York State, a school aged autistic student, between the age of 6 and 21 may be placed in-district or in an out of district private school or residential placement. Private school placements cost the home district thousands of dollars each year and teach the student alongside other disabled peers and separate from the general school population. The private school or residential placement are considered among the most restrictive as far as learning environments go. Conversely, an in-district placement may be in an inclusive general education classroom with typical peers, in an integrated class with both typical and disabled peers, or in an exclusive self-contained class surrounded by disabled peers, within a general education building. There appears to be a growing trend in the last decade of districts taking students back to their home districts from private placements (Yell, Katsiyannis, Drasgow & Herbst, 2003; Crockett & Kauffmann, 2013). This shift in placement can reduce spending, and increase integration opportunities for those students with nondisabled peers. While the sentiment seems positive, the supports in place and professionals required to provide the IDEA mandated evidence-based interventions, may not be up to task.

The use of evidence-based interventions seems commonplace in the literature pertaining to early intervention age autistic students from birth to age three (Lovaas, 1987; Remington et al. 2007; Warren et al. 2011). The literature on the use of evidence-based interventions with older school-aged students in the public school setting, however,

is scant. Articles can be found on specific interventions, like video modeling (Charlop-Christy, Le & Freeman, 2000; Nikopoulos & Keenan, 2003), or the use of discrete-trial teaching (Lovaas, 1987; Smith 2001; Downs, Downs, Johansen, & Fossum, 2007), but few deal specifically with exploring the barriers to intervention implementation of those servicing the middle school population. This gap in the literature, lead to further desire to investigate the implementation practices of professionals working with older school age students with autism, specifically those in middle school ages 11-13.

School Personnel Preparation, Training, and Support

Training, preparation and support of school personnel has been examined closely in the literature as a significant variable affecting implementation of evidence-based autism interventions (Cook, Landrum, Tankersley & Kauffman, 2003; Lerman, Vonderhorn, Addison, & Kahn, 2004; Morrier, Hess & Heflin, 2011; Sansoti & Sansoti, 2013). After all, how can special educators and psychologists be expected to perform such skill intensive interventions without receiving proper instruction themselves. Herein lies another vulnerability in the innovative diffusion of evidence-based practices, that is, not all training is equal. Some teachers and psychologists have received undergraduate and graduate school training, some have been limited to hands-on experience and full/half day workshops, while still others have had no practical experience.

There is a limited body of autism specific inquiry on the preparation of school psychologists. The available literature suggests doctoral programs offered the most practicum opportunities to work with individuals on the spectrum, but that masters programs offered only elective coursework (Sansoti & Sansoti 2013). Sansoti and Sansoti

(2013) surveyed 191 school psychology programs in the United States and found that, overall, school psychologists are exposed to a wide range of evidence-based intervention practices. Conversely, literature on teachers' training appears to be more postcertificate, and on-the-job (Lerman, Vorndran, Addison, & Kuhn, 2004), with elective course offerings for those interested in obtaining advanced specialty certifications beyond their initial teaching credential.

Special education teachers and school psychologists are required by professional licensing bodies to remain current and to maintain their professional knowledge through continuing education. School districts provide their personnel with ongoing professional development and training annually (Budman, Portnoy &Villapiano, 2003; Domitrovich et al., 2008). Professional development can sometimes miss the mark. A focus group of 49 special education teachers felt that district workshop offerings did not apply to them (Boardman et al. 2005). The heterogeneous presentation of autism spectrum disorder may require more intense professional coaching in situ, as opposed to the "spray and pray" (author unknown) method. Without proper and thorough training you spray them with a half-day lecture and pray they retained enough information to apply the interventions correctly in classroom. The skills required to address the needs of the autistic child supersede what can be covered in a day.

Autism consultation is perhaps a highly underutilized resource. Depending on the school district, a student classified by their Committee on Special Education with autism may have consultation stipulated on their Individualized Education Plan as a mandated related service. The mandate is 1-2 hours on average monthly to support school personnel

in managing the behavioral and educational needs of the autistic student. Despite the availability of such support, its acceptance may not be welcome. The relationship between the teacher or psychologist and the consultant must be one of mutual trust and commitment (Boudah, Logan, & Greenwood, 2001). Some may react negatively to an "outsider" telling them how to do their job and may feel spied on, regardless of the expertise the consultants offer. Others may reactively demonstrate evidence-based methods in the presence of the consultant or administrators and not implement them the remainder of the time.

Support is a broad-based and subjective term that can mean different things to different people. The type and level of support required will differ greatly from one professional to the next. A new and inexperienced teacher may require much more intensive supports than a seasoned psychologist who has had applied experience working with individuals on the spectrum. Much of the literature on support to the special education teacher focuses on mentoring (Dempsey & Christenson-Foggett, 2011).

School Culture

School culture is a broad-spectrum term used to describe how school staff see their role, approach their students, and perform their job (Ainscow & Sandhill, 2013). This underlying and invisible construct provides the context in which implementation of evidence-based interventions must occur. Carroll et al. (2011) identified school culture as a barrier which influenced how professionals delivered services to students with special needs. The environment, beliefs, and values of those and around those who provide

support to students with autism will affect the quality and fidelity with which it is applied (Carroll et al., 2011).

School culture is a multidimensional construct that for all intents and purposes included both school characteristics and school climate. School characteristics focused specifically on the organizational practices, classified as inclusive, exclusive, bureaucratic, and adhocratic. There has been support in the literature for both bureaucratic and adhocratic leadership styles (Domitrovich, et al. 2008; Skrtic, 1991). They each support implementation; however one is through policy and the other through practice.

Bureaucratic leadership guides its school personnel more directly through protocols and procedures. Implementation of evidence-based practices would more likely be explicitly prescribed, thereby making school professionals more accountable. In contrast, the adhocratic leadership style is innovative by nature and explicit directives would not be necessary for staff to implement evidence-based practices. They would engage in such activities because they problem solve using new and novel strategies as a matter of course.

The classroom climate is multifaceted and examines the quality of the social and physical environment, inclusive of staff attitudes, and takes into account support and safety. The literature suggests that healthy school cultures are inclusive (Ainscow & Sandhill, 2013; Symes & Humphrey, 2011), have a goal orientation, an effective means of communicating and utilizing resources, and convey a sense of cohesiveness and morale (Fairman & Clark, 1982). Macneil, Prater and Busch (2009) demonstrated that

schools with strong school cultures had better student outcomes. Generalizations should be made with caution as this study examined the academic gains of typical general education students, which may not apply to special education students.

Barriers to Implementation

A number of barriers to evidence-based practice implementation are discussed in this discourse. The two potential barriers--resources and school culture--were targeted for investigation because they appear to be recurrent and underlying themes throughout much of the literature on implementation practices. A school professional's ability to adopt and integrate evidence-based practice into their repertoires appears related to their training (Boudah, Logan & Greenwood, 2001; Cook, Landrum, Tankersley& Kauffman, 2003; Lerman, Vonderhorn, Addison & Kahn, 2004; Morrier, Hess & Heflin, 2011; Sansoti & Sansoti, 2013), availability or access to expert support (Boudah, Logan & Greenwood, 2001; Symes & Humphrey, 2011; Strogilos, Nikolaraizi & Tragoulia, 2012), and the school culture (Carroll et al. 2011; Ainscow & Sandhill, 2013; Symes & Humphrey, 2011; Strogilos, Nikolaraizi & Tragoulia, 2012) in which they practice. The goal of this proposed study is to examine the predictive ability of predictive variables related to evidence-based intervention implementation.

Summary

Themes which emerged throughout the literature review included the following: staff training is essential to successful program implementation (Boudah, Logan & Greenwood, 2001; Cook, Landrum, Tankersley & Kauffman, 2003; Koegel, Matos-Freden, Lang, & Koegel, 2012; Leblanc, Richardson & Burns, 2009), staff access to

autism expertise is a crucial resource for supporting the academic needs of students on the spectrum (Boudah, Logan & Greenwood, 2001; Symes & Humphrey, 2011), lack of autism understanding on behalf of the teachers is an identified impediment to supporting autistic students' needs (Symes & Humphrey, 2011), and school culture can support or hinder performance of evidence-based practice(Carroll et al. 2011; Ainscow & Sandhill, 2013; Symes & Humphrey, 2011).

There were several misalignments apparent in the literature. First, there was a gap between the skills necessary to effectively implement autism interventions and the skill training of school professionals in college and university programs. Second, there was a gap between the types of professional development offered, and what is practical for the staff implementing it. The third is more of a potential confounding variable in that the teachers and psychologists themselves may not necessarily be the ones carrying out the interventions; their paraprofessionals who support the students are. The teacher and psychologist may merely be supervising them, which bring to the forefront a host of new considerations. There are no credentials to become a paraprofessional and no special education or training. At the very least they may have a high school diploma or equivalent.

Furthermore, administrative support and an inclusive philosophy (Ainscow & Sandhill, 2010; Boudah, Logan & Greenwood, 2010; Symes & Humphrey, 2011) were identified as factors which bolstered positive school culture. It remains unknown whether a bureaucratic or adhocratic leadership style would best support the implementation of evidence-based practices.

A number of studies exploring factors associated with implementation were reviewed and found to have used highly subjective measurement methods, including interview, focus group, journaling and self report. This study contrasts prior studies with its use of quantifiable and objective data collection methods. Special education research is gaining recognition, and studies examining the effects of school culture on students with disabilities are small and in its infancy. It is difficult to generalize the findings of education based research conducted with general education students to special education students, such as those with autism spectrum disorder. This study, examined the population of interest, more specifically, and expanded the body of special education autism research.

Conclusion

In summary, chapter 2 provided a review of the current literature, and has revealed that educational resources and school culture impact effective school program implementation with regard to general educational interventions (Strogilos, Nikolaraizi & Tragoulia, 2012). Despite what is known and has been discussed, the nature or extent of the predictive relationship between resources and school culture on implementation of evidence-based autism interventions remained unclear.

The present study tried to fill the gap in the literature by quantifying the predictive relationship between resources and school culture on implementation of evidence-based autism interventions. Furthermore, adding to the scant body of autism middle school education research literature, to inform practices driving autism programs, and offer

feedback to school administrators who are charged with making placement decisions for their special education students.

Chapter 3 describes the methodology selected to conduct this study. The type of study, sampling procedures employed, target population, data collection procedures, and methods of analysis are discussed in detail.

Chapter 3: Research Method

Introduction

The purpose of this quantitative study was to develop a regression equation using resources (consultation and professional development) and school culture (school climate and school characteristics) to predict the implementation of evidence-based interventions. This study used a cross-sectional survey design to examine the predictive relationship between resources and school culture on intervention implementation of school psychologists and special education teachers. This chapter will discuss the research design methods used to conduct this study, including pertinent information on the approach, setting, and sample.

Research Design and Rationale

This study investigated seven predictor variables divided into two general categories: resources and school culture. The breakdown of categories was as follows resources: professional development and consultation; school culture: school climate, inclusive characteristic, exclusive characteristic, bureaucratic characteristic, and adhocratic characteristic. Consultation was measured by the number of hours of expert autism consultation support received monthly. Professional development was measured by the number of annual autism specific professional development hours completed. Classroom climate was measured by the score on the Organizational Health Inventory-M instrument. Inclusive characteristic, exclusive characteristic, bureaucratic characteristic, and adhocratic characteristic categorized by the respondent. Each participant could

belong to only one school characteristic group, as suggested by Cohen, Cohen, West, and Aiken (2003).

The criterion variables were implementation frequency and implementation duration of time spent engaged in evidence-based interventions. Implementation frequency was recorded as a continuous whole number of days per week on the information sheet provided. Implementation duration was recorded on the information sheet as a continuous whole number of hours per day.

The approach selected for use was a nonexperimental cross-sectional survey design. The Organizational Health Inventory for Middle School (OHI-M) instrument, along with several questions (see Appendix C), were distributed using the United States Postal Service. Data was collected from respondents at one point in time, describing specific events that had already taken place. Prior to conducting statistical analyses a thorough review of the respondent data was examined for completion, and those with missing values were discarded. First, a correlation matrix was run, and only significant correlations with predictors were included in the multiple regression analysis. Second, two multiple regression analyses were run, also using SPSS, to evaluate which predictor variables were greater predictors of implementation duration and frequency.

Multiple regression was appropriate for this study as the desired outcome was to examine which of the select factors were predictors of implementation. Establishing a linear relationship between resource or culture variables will aide in identifying specific factors that can be targeted specifically to increase evidence-based intervention implementation behavior. Survey design has previously been used to explore the

prevalence and implementation of evidence-based intervention in special education (Burns &Ysseldyke, 2009; Morrier et al., 2011; Sansosti &Sansosti, 2013), social validation of evidence-based practices in autism education by school personnel (Callahan, Henson, & Cowan, 2008), and the effects of school culture on educational outcomes (Macneil, Prater, & Busch, 2009). This precedent made it an appropriate medium for addressing the research questions presented in this study. My objective was to use the gathered data to predict the implementation practices of other professionals working with autistic middle school students based on consultation, professional development, school climate, and inclusive, exclusive, bureaucratic, or adhocratic characteristics. While it is not possible to ascertain with 100% accuracy how an individual will behave, it is feasible to make an educated guess based on what we learned about the relationships between and among the variables involved in this study.

The Organizational Health Inventory instrument and question sheet was mailed to the respondents. Identified resource constraints included financial cost of $613.00 for the one-time use of the MGI Lists from the Media Services Division of Marketing General Incorporated for the participants' contact information, $316.58 for copying of the instrument and consent forms, $138.78 for envelopes and mailing labels, and $1,145.17 for delivery and response postage costs. The respondents' mailing information purchased was specific to the professionals listed with the Council on Exceptional Children registry. There was a 72-hour turnaround time once the request was approved by the marketing company and payment had been received.

The use of survey design for this study was consistent with the social science literature in the field of psychology. Survey methods are a cost-effective and efficient means for gathering data from large groups of respondents who are spread out across a wide demographic area (Creswell, 2009). Surveys allow for anonymity of those teachers and psychologists participating, affording them a higher level of comfort answering sensitive questions about their professional work habits. The use of mail as a disbursement method increased the geographic representation of the sample with relative ease. The format was easily administered, understood by the respondents, and standardized.

Methodology

Participants

The participant pool was purchased from a published registry list. This registry is maintained by the Council on Exceptional Children and managed by MGI Lists. Those listed with the registry voluntarily do so. The list of potential respondents purchased was specific to those identified as certified special education teachers and school psychologists who identify as serving students with Autism and Developmental Disabilities at the middle school level.

Sampling and Sample Procedures

A G-Power apriori computation suggested a sample size of 278 participants in order for significant inferential conclusions to be drawn (Buchner, Erdfelder, Faul, & Lang, 2009). The effect size was established at 0.15 as per Cohen (1988), with an alpha level set at 0.05, and a power of .95.To obtain this, a convenience sample of certified

special education teachers and certified school psychologists was purchased from a published registry. The sampling method was selected based upon the specificity of the target population of interest, difficulty in obtaining contact information for these professionals, and financial constraints. The registry list for psychologists available through this particular list service was 400. The registry list of special education teachers who identified with autism and developmental disabilities and middle school was 1000.

Survey instruments were sent out to all 400 psychologists on the list. From the teacher list of 1,000 names, survey instruments were sent out to the first 672 teachers listed. This sampling procedure was based on the number of participants required for the power desired, budgetary limitations, and an anticipated return rate of approximately 25%. A total of 1,072 survey instruments were sent out in all on July 21, 2014. Surveys returned from respondents who identified as special education teacher/school psychologist actively working with autistic students in the public middle school setting were to be included in further analysis. This was a nonrepresentative sample comprised of a disproportionate but unknown ratio of teachers to psychologists, as demographic questions were not included in the study and the respondents were not asked to identify themselves.

Procedures for Data Collection

A paper copy of the Organizational Health Inventory (OHI-M) instrument and question sheet were collected for data analysis. The participants received self-addressed and stamped return envelopes to ease turn around. A letter of informed consent, found in Appendix A, was on the first page of the mailer. A standardized test and question sheet

were completed anonymously, thereby assuring the anonymity of the individual and school districts participating. The investigator did not have any direct contact with the participants at anytime. Once the mailer returns ceased, approximately 8 weeks after dissemination, the data was entered into SPSS statistical software.

Instrumentation and Material

Organizational Health Inventory Scale

The Organizational Health Inventory (OHI) instrument found in Appendix B is a 45-item scale developed by Hoy and Feldman (1987). The OHI was designed to assess the culture and overall health of the school organization. It is a multidimensional tool which evaluates a school's health on the basis of relationships between teachers, administrators and students (Hoy & Feldman, 1987). The instrument and scoring tool is public and was accessed at http://www.waynekhoy.com/ohi-m.html.

There are three versions of the OHI, one for elementary, middle, and secondary schools. The seven dimensions that comprise the Organizational Health Inventory – Middle (OHI-M) include: institutional integrity, collegial leadership, consideration, principal influence, resource support, teacher affiliation, and academic influence (Hoy & Feldman, 1987). The forty-five item scale was measured on a 4-point Likert-type scale, ranging from "rarely" to "very frequently occurs". The OHI was selected for this study because it was designed to be used with school personnel because of the precise dimensions of school culture it measures.

The OHI-M has established reliability for use in assessing the overall health of the school organization, with Cronbach's alphas ranging from .93 to .94 (Hoy & Feldman,

1987). The OHI-M has been tested by a confirmatory factor analysis of a number of samples validating construct validity for organizational health (Hoy & Feldman, 1998). It has been suggested by Hoy and Feldman (1987) that all seven dimensions of the instrument be used to create a more complete picture of school health. For purposes of this study the total score standardized for all 7 dimensions was used in the analysis. Respondents' raw scores were converted to standardized scores, based on a large sample of schools in New Jersey (Hoy & Feldman, 1987). The range of standardized scores for any one person is 400-600, with a mean score of 500 and standard deviation of 100 (Hoy & Feldman, 1987). Participants scoring between 490 and 510, are considered working in average schools, and below 400 indicated that they were working in a school with poor health (Hoy & Feldman, 1987).

Question Sheet

In order to measure some of the predictor variables (consultation, professional development, school characteristics) and the criterion variables (implementation frequency, implementation duration) the following questions, appearing in Appendix C, were posed:

1. Are you a special education teacher or certified school psychologist currently working in a public middle school setting with autistic students? This question was posed to ensure that participants met inclusionary criteria for the study. The acceptable responses were yes or no, and data was categorical. Those returned with a no response were excluded during preanalysis data screening.

2. How many hours of autism specific continuing education/professional development have you completed this academic year? This question was asked to measure the predictor variable professional development. The acceptable responses were numerical and continuous.

3.How many hours of expert autism consultation do you receive monthly? This question was asked to measure the predictor variable consultation. The acceptable responses were numerical and continuous.

4.What is the weekly frequency (i.e., number of days) in which you engage in evidence-based interventions (i.e., proactive antecedent-based intervention's, behavior-based focusing on the antecedent-behavior-consequence contingency, applied behavior analytic instructional practices including discrete trial teaching, incidental teaching, errorless teaching, shaping, modeling, and naturalistic teaching (The National Autism Center, 2011)? This question was asked to measure the criterion variable implementation frequency. Acceptable responses were numerical and continuous number of days.

5. What is the weekly duration of time that you spend engaging in evidence-based intervention implementation (i.e., number of hours)? This question was asked to measure the criterion variable implementation duration. Acceptable responses were numerical and continuous number of hours.

6.Please classify the school in which you serve autistic middle school students as 0 inclusive, 1 exclusive, 2bureaucratic or 3 adhocratic. This question was asked to measure the predictor school characteristic. Acceptable responses were categorical (inclusive, exclusive, bureaucratic, adhocratic).

Data Analysis

Two multiple regression analyses using the step wise method were applied to the data utilizing SPSS. Both methods used the same seven predictors. However, the criterion variable for the first one was implementation of frequency (Y1) and for the second implementation of duration (Y2).

The seven predictor variables were:

1) number of expert consultation support hours (X1),
2) number of professional development hours (X2),
3) school climate OHI score (X3),
4) inclusive characteristic (X4),
5) exclusive characteristic (X5),
6) bureaucratic characteristic (X6), and
7) adhocratic characteristic (X7).

Consultation, professional development, and school climate were continuous variables. The four school characteristic variables (inclusive, exclusive, bureaucratic, adhocratic) were categorical variables that were transformed into dummy variables for purposes of analysis. The multiple regression equations for implementation frequency and duration were: $\hat{y}_i = b_0 + b_1x_{1i} + b_2x_{2i} + b_3x_{3i} + b_4x_{4i} + b_5x_{5i} + b_6x_{6i} + b_7x_{7i,}$ and, $\hat{y}_{ii} = b_0 + b_1x_{1ii} + b_2x_{2ii} + b_3x_{3ii} + b_4x_{4ii} + b_5x_{5ii} + b_6x_{6ii} + b_7x_{7ii,}$ .The multiple R (R), AdjR^2, observed F, degrees of freedom and significance level, and effect size were reported in Chapter 4 for each of the two multiple regression analyses. The unstandardized regression coefficient (B), standardized regression coefficient (B) the B with a tail on it, observed t value (t),

significance level, and semi partial correlation (variance accounted for per variable) are reported for each of the selected predictor variables analyzed in the regression.

Multiple linear regression was the selected method of analysis used to test my hypotheses. It was used in this study to examine whether the select predictor variables alone or in combination could account for the changes in the criterion variable. My objective was to use the gathered data to construct a regression equation using seven predictors discussed earlier to predict evidence-based intervention implementation. This method allowed for concurrent analysis of multiple predictors on a dependent variable, making it the most suitable to answer the stated research questions. The Kolmogorov-Smimov test (K-S test) was used to test the assumption of normality of the sample distribution, and Levene's test was used to test the homoscedasticity using SPSS.

Chapter 4 provides descriptive statistics for all variables, inclusive of the number of cases, mean, and standard deviation. Additionally, for each regression model, confidence levels for each regression coefficient, regression coefficients, correlation matrix, standard error of the estimate, predicted values, and residuals will be reported.

A number of other statistical analyses were considered when deciding upon multiple regression analysis. The Pearson Product-Moment Correlation Coefficient, while suitable for use when studying correlations between two or more variables as posed in this study, and uses interval data, the Pearson requires random sampling, which was not feasible (Green & Salkind, 2011). Canonical correlation, similar to multiple regression can measure the strength of the relationship among many variables. Canonical correlation also allows for analysis of multilevel variables, making it appropriate for measuring the

duration and frequency of implementation proposed for examination. Multiple regression was selected over Canonical correlation because of its specificity. Canonical correlation predicts multiple criterion variables simultaneously and is more general than multiple regression.

Threats of Validity

Threats to external validity included small sample size, and subsequent weak generalizability to the larger population of special education teachers and school psychologists. In response, the sample size was calculated using G Power, and adjusted for an estimated 30% response rate. Selection was considered as a potential threat to internal validity. Perhaps those who allow themselves to be contacted via the professional registry or those who choose to respond to the survey request have certain characteristics that predispose them to different feelings on adherence to federal education mandates and the use of evidence-based treatment. Selection threats were unavoidable. There was scarce availability of participant lists for purchase meeting the inclusionary criteria for this study, and financial constraints, which greatly impacted the size of the sample. For these reasons random selection was not attempted due to the small number of potential respondents. A mailing was sent to a convenience sample of 1,072 participants in an effort to obtain the minimum response rate for meaningful inferences to be generated.

Ethical Procedures

An application was filed with the Institutional Review Board (IRB) seeking permission to proceed with this study, which included the use of human participants. The

Institutional Review Board approval # is 07-17-14-0283619. All precautions were taken to ensure the safe and ethical treatment of those involved.

Ethical considerations were taken very seriously to protect the identities of the respondents, and their respective schools. The instrument and question sheet was completed anonymously. The principal investigator did not have any direct personal contact with the respondents nor was able to identify them. A cross-sectional design was implemented, and there was no follow-up contact with the respondents by the principal investigator.

Informed consent was addressed on the first page of the mailer prior to the instrument and questions being presented. Participants were informed that their participation was voluntary, and that they had the right to participate or not. They were assured that if they felt uncomfortable answering a question they may skip it or withdraw their participation.

Data is being maintained by the principal investigator in a secured and locked cabinet, at 12 Tidewater Ave, Massapequa, New York. The principal investigator and doctoral committee members have access to the research study data. Information obtained during the course of the study will be maintained for a minimum of seven years, and then disposed of in accordance with the standards set forth by the American Psychological Association.

A formal request was submitted to MGI Lists, Media Services Division of Marketing General Incorporated, found in Appendix D, requesting permission to rent the mailing list on Council on Exceptional Children, and agreeing to its one-time use, and

terms of confidentiality. Those who allow themselves to be part of the mailing list are knowledgeable that the lists are available for rent, and can opt out of the system should they prefer not be contacted.

Summary

The design and methodology for this study have been presented in chapter 3. The study is a non-experimental quantitative cross-sectional survey design. Chapter 4 proceeds with descriptive statistics, and the results of two multiple linear regressions.

Chapter 4: Results

Introduction

The purpose of this quantitative study was to determine if a regression equation could be developed to see if specific predictor variables were able to predict the implementation of evidence-based interventions. Insight into how these select variables effect implementation intervention could be used to predict an outcome and assist administrators charged with securing professional development, allocating funds, and making administrative and student placement decisions. This study was designed to answer 1.) Which of the possible seven predictor variables (professional development, consultation, school climate, inclusive characteristic, exclusive characteristic, bureaucratic characteristic, adhocratic characteristic) are included in a regression equation for predicting frequency of evidence-based intervention implementation? 2.) Which of the possible seven predictor variables (professional development, consultation, school climate, inclusive characteristic, exclusive characteristic, bureaucratic characteristic, adhocratic characteristic) are included in a regression equation for predicting duration of evidence-based intervention implementation?

The hypotheses were tested using multiple linear regression two times, and were as follows:

$H_{01:}$ Resources and culture will not predict the frequency of evidence-based intervention implementation

H_{a1}: Resources and culture will predict to the frequency of evidence-based intervention implementation

H_{02}: Resources and culture will not predict the duration of evidence-based intervention implementation

H_{a2}: Resources and culture will predict the duration of evidence-based intervention implementation.

This chapter begins with a thorough review of the instrument and question sheet data collected, inclusive of timeline indicating when mailers were sent out and returned. The number of survey instrument/question sheets returned, and any discrepancies noted. This is followed by the results, statistical analyses, and summary sections.

Data Collected

On July 21, 2014, mailers including the informed consent form, OHI-M instrument, and question sheet were mailed out to 1,072 prospective participants. One hundred and five were returned within the first 2 weeks, to which an additional 77 were added by the four-week mark, for a total of 182 returned survey instruments. One hundred and twenty-two mailers were returned marked “return to sender” or “undeliverable,” indicating that either the contact information was inaccurate or that the respondent rejected receipt. With a 17% return rate, the sample is not likely representative of the larger population.

Prior to analysis, data were screened for completion and exclusionary criteria. Of those returned,40 were discounted due to a “no” response to the first question asking if they were a certified special education teacher or school psychologist currently working in a public middle school setting with autistic students, and 5 were discounted because they were incomplete or inappropriate. Inappropriate responses were those that did not

answer the question posed (i.e. "does not apply to me", or "it varies" instead of a numerical/categorical or Likert response). A total of 137 surveys met the criteria for inclusion in this research study (n = 137). According to Tabachnick and Fidell (1996), this sample size exceeds the recommended ratio of cases to independent variables, 50+8 (7) = 106 to test regression.

Results

The sample was comprised of an unknown but unequal ratio of special education teachers and certified school psychologists who resided within the United States of America. The variables were measured using either continuous scale or categorical. The categorical variables were further transformed into dummy variables for purposes of analysis. The first three predictor variables (consultation, professional development, climate), and two criterion variables (implementation frequency, implementation duration),were continuous variables, as summarized in Table 1. Figure 1 displays the categorical variables (inclusive, exclusive, bureaucratic, adhocratic).

The responses to the questions posed on the question sheet were as follows: 73% of the 182 respondents answered “yes” that they were a certified special education teacher or school psychologist currently working in a public middle school setting with autistic students; the number of annual hours of autism specific continuing education/professional development ranged from 0 to 14, with $\bar{X}$ = 2.13; the number of expert autism consultation hours received monthly ranged from 0 to 6, with $\bar{X}$ = .42; the weekly frequency (recorded as number of days) engaged in evidence-based practice ranged from 0 to5, with $\bar{X}$ = 3.40; and the weekly duration (recorded as hours) spent

engaged in evidence-based practice ranged from 0 to 35, with $\bar{X} = 10.73$; school classification, 58% identified as inclusive, 9% identified as exclusive,18% identified as bureaucratic, 15% identified as adhocratic, summarized in Table 1 and Figure 1.

Table 1

Question Sheet Response Descriptive Summary

Question	M	Range	*SD*
Professional Development	2.13	0-14	3.14
Consultation	.42	0-6	1.06
Climate	506.40	250-740	102.75
Implementation Frequency	3.40	0-5	2.10
Implementation Duration	10.73	0-35	10.34

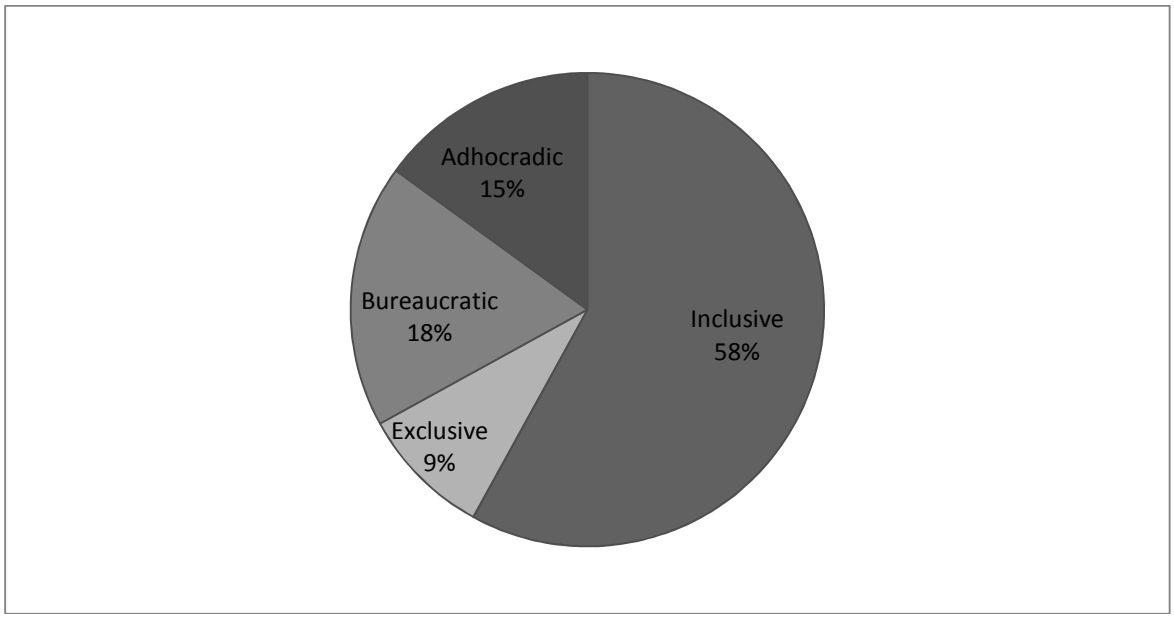

*Figure 1.*A pie chart showing the school characteristic proportions from the question sheet responses.

The Organizational Health Inventory for Middle School (OHI-M), the instrument used to measure school climate, yielded scores for seven subscales. The subscale average was used for analysis. The seven subscales measured institutional integrity, collegial

leadership, principal influence, resource support, teacher affiliations and academic emphasis. The minimum, maximum, mean and standard deviation for each individual OHI-M subscale are shown in Table 2. The OHI-M Health scores, representing the average of the seven sub scales ranged from 250 to 741, with $\bar{X} = 504$. According to the standardized scores in the normative sample 500 is considered average (Hoy, 1997).

Table 2

Organizational Health Inventory – Middle School Subscales

Subscale of the OHI	*n*	Minimum	Maximum	Mean	*SD*
Institutional Integrity	137	-73	947	597	168
Collegial Leadership	137	-211	753	448	156
Teacher Affiliation	137	-136	642	359	156
Principal Influence	137	-2	860	499	151
Resource Support	137	130	777	482	168
Academic Emphasis	137	0	1032	631	168

A correlation matrix shown in Table 3 was computed to identify the significant correlations between the predictor variables and the criterion variables. Pearson's product-moment correlation was used for the continuous variables, and for the categorical variables the point biserial (Field, 2009, p. 183) was calculated.

While correlation does not infer causation, it does demonstrate a relationship between variables. The significant correlations for the predictors with frequency were professional development .301, and consultation .325. The significant correlations for the predictors with duration were professional development .252, and consultation .331.These can be found in Table 3.The school characteristic predictors (inclusive,

exclusive, bureaucratic, and adhocratic) and school climate were not found to be significantly correlated and were therefore removed from further analysis.

Table 3

Correlation Matrix

Criterion Variables		Professional Development	Consultation	Climate	Inclusive	Exclusive	Bureaucratic	Adhocratic
	Pearson Correlation	.301**	.325**	.069	-.069	-.020	.030	.078
Implementation	Sig. (2-tailed)	.000	.000	.426	.421	.813	.727	.367
Frequency	N	137	137	137	137	137	137	137
	Pearson Correlation	.252**	.331**	.067	-.137	.036	.079	.086
Implementation	Sig. (2-tailed)	.003	.000	.437	.110	.675	.357	.317
Duration	N	137	137	137	137	137	137	137

The first research question asked which of the possible seven predictor variables (professional development, consultation, school climate, inclusive characteristic, exclusive characteristic, bureaucratic characteristic, adhocratic characteristic) are included in a regression equation for predicting frequency of evidence-based intervention implementation. The first multiple regression analysis, as depicted in Tables 4 and 5, was conducted, using the SPSS default settings for stepwise entry to determine which resources and culture measures were possible predictors of implementation frequency.

Table 4

Model Summary: Implementation Frequency

					Change Statistics				
Model	R	R^2	Adjusted R^2	*SE*	R^2 Change	F Change	df1	df2	Sig. F Change
1	.33[a]	.11	.099	2.422	.105	15.909	1	135	.000
2	.41[b]	.16	.152	2.350	.059	9.429	1	134	.003

The multiple correlation coefficient for the first significant predictor variable entered into the regression equation, was consultation with a correlation of .33, indicating that 11% of the variance of evidence-based intervention implementation frequency can be accounted for by consultation alone. The multiple correlation coefficient for the second significant predictor variable entered next into the regression equation, was professional development , with a correlation of .30, indicating that 9% of the variance of evidence-based intervention implementation frequency can be accounted for by professional development alone. Together consultation and professional development was .41 indicating that 16% of the variance of evidence-based intervention implementation frequency can be accounted for by the linear combination of both. The linear combination of resource measures (consultation and professional development) was significantly related to implementation frequencyR^2= .16, R^2Adj = .152, F (1 ,134)= 9.429 , p = .003, over consultation alone R^2= .11, R^2Adj = .099, F (1 ,135)= 15.909 , p = .000.

Table 5

Regression Coefficients: Implementation Frequency

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations		Collinearity Statistics	
		b	*SE*	β	t	Sig.	Partial	Part	Tolerance	VIF
1	(Constant)	3.292	.219		15.001	.000				
	Consultation	.278	.070	.325	3.989	.000	.325	.325	1.000	1.000
2	(Constant)	2.979	.236		12.620	.000				
	Consultation	.237	.069	.276	3.431	.001	.284	.271	.962	1.040
	Professional Development	.074	.024	.247	3.071	.003	.256	.243	.962	1.040

The multiple regression equations for the first research question was $\hat{y}_i = (3.292) + (.278X_{1i})$ for consultation alone, and $\hat{y}_i = (2.979) + (.237\ X_{1i}) + (.074X_{2i})$ for the combined professional development and consultation. When the influence of consultation alone ($\beta = .278$, $p = .000$) was examined it was a significant predictor of implementation frequency. When the influence of consultation and professional development combined ($\beta = .237$, $p = .001$; $\beta = .074$, $p = .003$) were examined it was a significant combination. The semi-partial correlation coefficients were .271 and .243 for consultation and professional development combined indicating that consultation was a greater predictor of the individual predictor variables. The overall model fit was weak in general, but greater for the linear combination of consultation and professional development at 16% over consultation alone at 11%.

Table 6
Implementation Frequency ANOVA

Model		Sum of Squares	*df*	Mean Square	F	Sig.
1	Regression	93.328	1	93.328	15.909	.000[b]
	Residual	791.956	135	5.866		
	Total	885.285	136			
2	Regression	145.390	2	72.695	13.166	.000[c]
	Residual	739.895	134	5.522		

The ANOVA, as depicted in Table 6, examined the degree to which the amount of variance observed in the model, and relationship between consultation and professional development was statistically significant. For consultation alone it was F (1, 135) = 15.909, p = .000. For consultation and professional development it was F (2, 134) = 13.166, p = .000.The p-value for each set is less than .001. Results indicate that the probability that the results are due to chance is less than 1 in 1,000.

The first null hypothesis, which states that resources and culture will not predict frequency of evidence-based intervention implementation, is rejected. The alternative hypothesis that resources and culture will predict frequency of evidence-based intervention implementation, is retained.

The second research question asked which of the possible seven predictor variables (professional development, consultation, school climate, inclusive characteristic, exclusive characteristic, bureaucratic characteristic, adhocratic characteristic) are included in a regression equation for predicting duration of evidence-based intervention implementation? The second multiple regression analysis, as depicted

in Tables 7 and 8, was conducted, using the SPSS default setting for stepwise entry, to determine which resources and culture measures were possible predictors of implementation duration.

Table 7

Model Summary: Implementation Duration

					Change Statistics				
Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	R^2 Change	F Change	df1	df2	Sig. F Change
1	.33[a]	.11	.103	10.015	.109	16.555	1	135	.000
2	.38[b]	.15	.133	9.843	.037	5.754	1	134	.018

The multiple correlation coefficient for the first significant predictor variable entered into the regression equation, was consultation with a correlation of .33, indicating that 11% of the variance of evidence-based intervention implementation duration can be accounted for by consultation alone. The multiple correlation coefficient for the second significant predictor variable entered next into the regression equation, was professional development with a correlation of .25, indicating that 8% of the variance of evidence-based intervention implementation duration can be accounted for by professional development alone. Together consultation and professional development was .38, indicating that 15% of the variance of evidence-based intervention implementation duration can be accounted for by the linear combination of consultation and professional development. The linear combination of resource measures was significantly related to

implementation duration R^2= .15, R^2adj = .133, F (1,134)= 5.754, p = .018 over consultation alone R^2= .11, R^2adj = .103, F (1,135)= 16.555, p = .000.

Table 8

Regression Coefficients: Implementation Duration

		Unstandardized Coefficients		Standardized Coefficients			Correlations		Collinearity Statistics	
	Predictor Variables	B	Std. Error	Beta	t	Sig.	Partial	Part	Tolerance	VIF
1	(Constant)	9.708	.907		10.698	.000				
	Consultation	1.174	.289	.331	4.069	.000	.331	.331	1.000	1.000
2	(Constant)	8.683	.989		8.781	.000				
	Consultation	1.039	.289	.292	3.590	.000	. .296	.287	.962	1.040
	Professional Development	.244	.102	.195	2.399	.018	.203	.192	.962	1.040

The multiple regression equations for the second research question was $\hat{y}_{ii}$ = *(9.708)* +(1.174 X_{1ii}) for consultation alone, and $\hat{y}_i$ = *(8.683)* + (.1.039 X_{1ii}) + (.244X_{2ii}) for professional development and consultation combined. When the influence of consultation on implementation duration alone (β= 1.174, p= .000) was assessed it was a significant predictor. When the influence of consultation and professional development combined (β= 1.039, p = .000; β= .244, p = .018) were assessed it was a significant predictive combination. The semi-partial correlation coefficients were .287 and .192 for consultation and professional development combined indicating that consultation was a stronger predictor of the individual predictor variables. The overall model fit was weak in

general, but greater for the linear combination of consultation and professional development at 15% over consultation alone at 11%.

The second null hypothesis, which states that resources and culture will not predict duration of evidence-based intervention implementation, is rejected. The alternative hypothesis that resources and culture will predict duration of evidence-based intervention implementation, is retained based on these findings.

Table 9

Implementation Duration ANOVA

Model		Sum of Squares	*df*	Mean Square	F	Sig.
1	Regression	1660.481	1	1660.481	16.555	.000[b]
	Residual	13540.241	135	100.298		
	Total	15200.723	136			
2	Regression	2217.957	2	1108.978	11.446	.000[c]
	Residual	12982.766	134	96.886		
	Total	15200.723	136			

The implementation duration ANOVA, as depicted in Table 9, examined the degree to which the amount of variance observed in the model, and predictive relationship between consultation and professional development, was statistically significant. Consultation alone was F (1, 135) = 16.555, p = .000.Consultation and professional development combined was F (2, 134) = 11.446, p = .000. The p-value for each set is less than .001. Results indicate that the probability that the results are due to chance is less than 1 in 1,000.

Statistical Assumptions

The first model assumption of statistical regression assessed was linearity. This was conducted to ensure that there was a linear relationship between the variables. The variance inflation factor (VIF) and tolerance were examined to measure multicollinearity in each regression model. All VIF and tolerance measures were close to 1 (Mertler & Vannatta, 2005), shown in Tables 5 and 8, indicating that collinearity was not associated with implementation frequency or implementation duration. Multicollinearity testing of implementation frequency and implementation duration resulted in identical results; frequency: consultation, tolerance = 1.0, VIF = 1.0; and professional development, tolerance = .962, VIF = 1.04; duration: consultation, tolerance = 1.0, VIF = 1.0; and professional development, tolerance = .962, VIF = 1.04.

The second model assumption of statistical regression assessed was normality. The Kolmogorov-Smimov (K-S test), which tests the null hypotheses (Mertler & Vannatta, 2005), as shown in Figure 10, revealed that climate was normally distributed, illustrated by histogram Figure 2, thus meeting the assumption. The K-S test also revealed that it is unlikely that there was a normal distribution for the two resource variables, consultation and professional development, thereby failing to meet the assumption in its raw state.

Table 10

One-Sample Kolmogorov-Smirnov Test Results

Predictor Variable	Distribution	Professional Development	Consultation	Climate
	n	137	137	137
Normal Parameters[a,b]	Mean	4.79	1.05	506.40
	SD	8.473	2.975	102.753
Most Extreme Differences	Absolute	.286	.375	.077
	Positive	.283	.375	.077
	Negative	-.286	-.362	-.067
Kolmogorov-Smirnov Z		3.347	4.387	.898
Asymp. Sig. (2-tailed)		.000	.000	.396

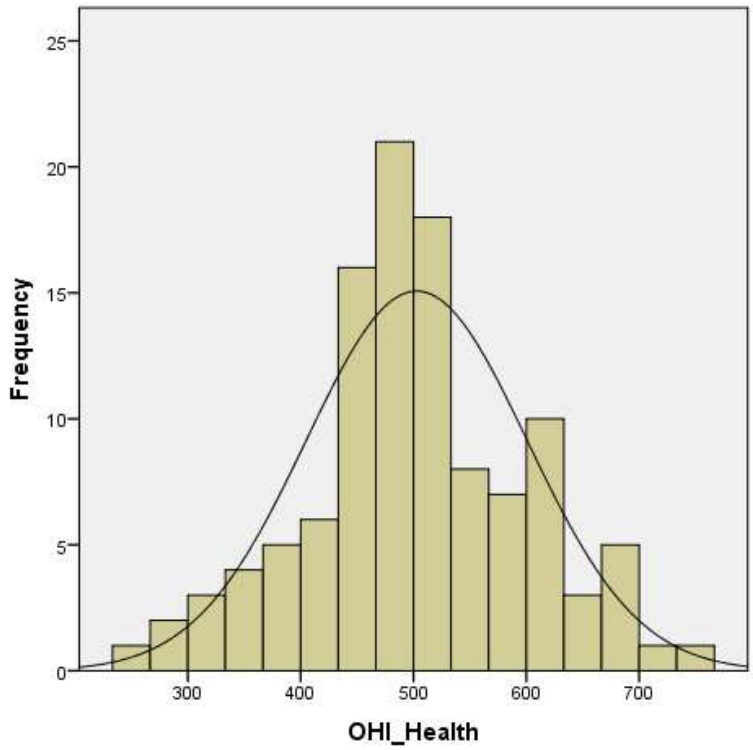

Figure 2. A histogram for the predictor school climate illustrating OHI-M scores.

Both consultation and professional development measures required transformation due to severe positive skewing, due to more than half of the respondents reporting that they received zero hours of consultation, and completed zero hours of autism specific professional development. A log transformation was conducted on each variable as recommended by Mertler and Vanatta (2005; see Figures 3 and 4). A thorough discussion of the implications will be addressed in Chapter 5.

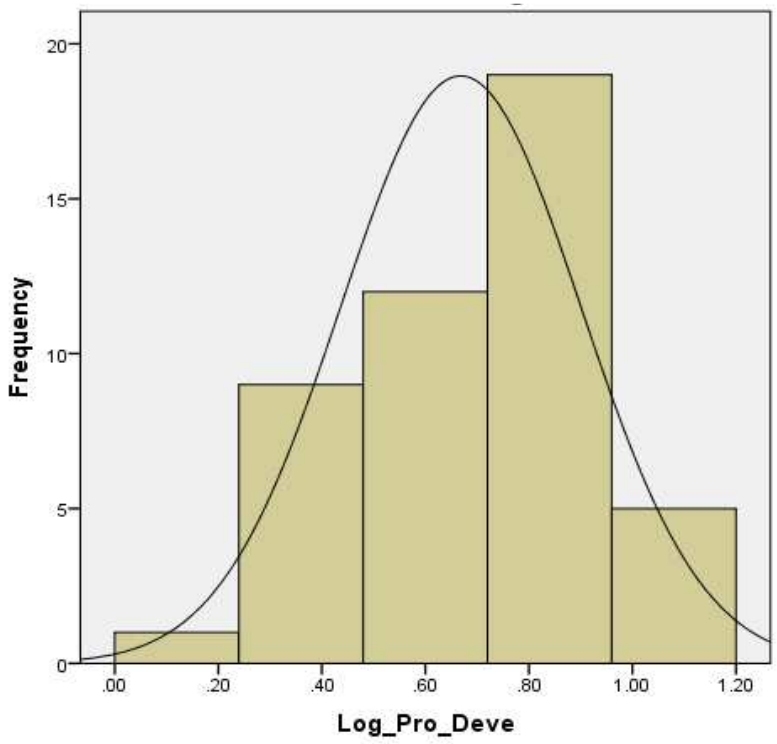

Figure 3. A histogram for the predictor professional development hours following log

transformation.

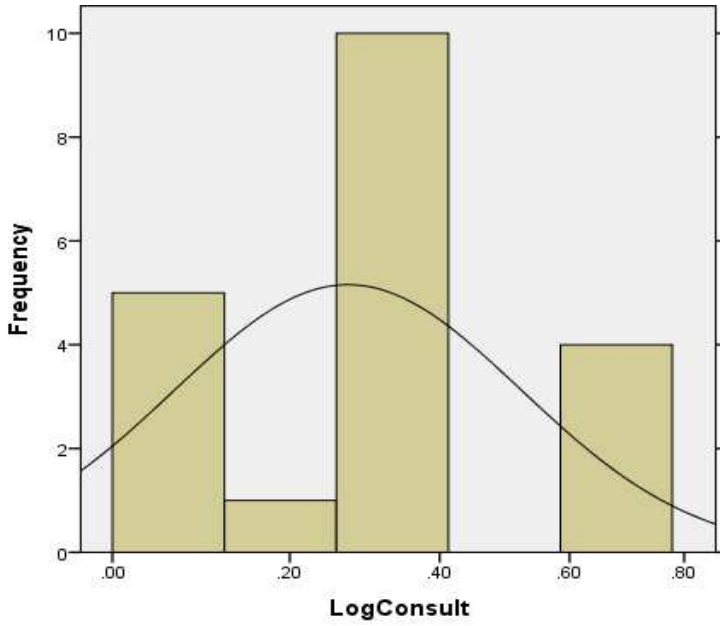

Figure 4. A histogram for the predictor consultation hours following log transformation.

The third model assumption of multiple regression analysis assessed was homoscedasticity. Levene's Test for Equality of Variance, as shown in Table 11, was conducted to assess the assumption of equal variances. The critical value was set at $\alpha = .05$. The results for Levene's test for Equality of Variance were .426, and .428 for professional development and consultation respectively. These results all exceeded the critical value, and as such equal variances were assumed for consultation and professional development.

Table 11

Levene's Test for Equality of Variances Results

		Levene's Test for Equality of Variances		*t* test for Equality of Means						
		F	Sig.	T	*df*	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Professional Development	Equal variances assumed	.637	.426	1.045	135	.298	6.304	6.033	-5.628	18.236
	Equal variances not assumed			.698	1.013	.611	6.304	9.029	-104.992	117.599
Consultation	Equal variances assumed	.632	.428	4.592	135	.000	9.085	1.978	5.173	12.998
	Equal variances not assumed			37.868	134.000	.000	9.085	.240	8.611	9.560

In summary, with respect to the first research question, the resources consultation and professional development in combination were greater predictors of implementation frequency of evidence-based intervention. Similarly, with respect to the second research question it was also found that the resources consultation and professional development

in combination were greater predictors of implementation duration of evidence-based intervention.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

This chapter begins with a review of the research study, summation of the interpretation of the findings, and discussion on limitations. This will be followed by recommendations for future research, and social significance. The final section will conclude with implications for special education and autism research.

The purpose of this quantitative study was to develop a regression equation to predict if resources (consultation and professional development) and school culture (school climate and school characteristics) can predict the implementation of evidence-based interventions. Insight into factors which predict greater implementation practices can be used to inform targeted interventions to increase implementation behavior; these interventions are designed to make school personnel more equipped to educate students with autism in the public school setting. In order to successfully move away from restrictive private school placements, and integrate students with autism into their local district public schools, school personnel must be prepared to meet their unique behavioral and educational needs. Evidence-based interventions are not only crucial to educating students with autism, but are required by the federal education law, specifically No Child Left Behind (NCLB, U.S. Department of Education,2013). Resources and culture have been cited by the literature as factors which can support or impede a professional's ability to adopt new interventions.

Interpretation of the Findings

This research study set out to answer two research questions and determine whether related hypotheses were accepted or rejected. The first question asked which of the seven possible predictor variables (professional development, consultation, school climate, inclusive characteristic, exclusive characteristic, bureaucratic characteristic, adhocratic characteristic) were included in a regression equation for predicting frequency of evidence-based intervention implementation. The null hypothesis stating that resources and school culture would not predict implementation frequency was rejected. The alternative hypothesis was accepted as both consultation and professional development were found to be greater predictors of implementation frequency. The second question asked which of the seven possible predictor variables (professional development, consultation, school climate, inclusive characteristic, exclusive characteristic, bureaucratic characteristic, adhocratic characteristic) were included in a regression equation for predicting duration of evidence-based intervention implementation. The second null hypothesis stating that resources and school culture would not predict implementation duration was rejected. The alternative hypothesis was accepted as both consultation and professional development were predictors of implementation duration.

According to the results of the two multiple regression analyses, consultation and professional development combined were better predictors of implementation frequency and duration than either professional development or consultation alone. The inclusive, exclusive, bureaucratic, and adhocratic school characteristic factors and school climate

were eliminated during preanalysis screening based on the correlation matrix, which showed that they were not significant predictors of implementation behavior.

The data suggested that both consultation and professional development were predictors of evidence-based intervention implementation behaviors. However, these resources only contributed 15% of the variance to professional evidence-based practice implementation. This suggests that school personnel who receive consultations feel more confident in carrying out evidence-based strategies because of the guidance and direction they receive. In this context, autism consultants act as liaisons and conduits between classroom teachers and psychologists to the realm of scientific evidence-based research. A consultant can also provide ongoing role modeling, coaching, and performance feedback in the natural learning environment. This situation specific support is more tangible than what can be learned in a book or article (Lerman, Vorndran, Addison, & Kuhn, 2004). The use of consultation addresses the day-to-day programmatic particulars in context, supporting successful diffusion of innovation described by Rogers (1995). Consultation has also been cited as one of the core supports to successful intervention implementation (Domitrovich et al., 2008). This support role reaches staff on an individual level by advocating for changes in intervention strategy, encouraging new innovations, boosting confidence in those who are insecure, and maintaining programs across time. In my professional experience, at the school level, a consultant provides the administration with assurance that intervention strategies are in compliance with federal education regulations and peace of mind that behavioral crises will be addressed before they become out of control.

Perhaps behavioral support though consultation offers an additional layer of checks and balances within the school organizational system. School personnel may be more apt to follow through on evidence-based strategies if they know an expert will be periodically checking in on their progress, and reporting back to their chairpersons. In my experience, in working as a Consultant in the public school system for the past 10 years, staff have been more likely to follow through with intervention strategies when they know I will be back in two weeks to perform fidelity checks, and will be looking to review their data. Behaviorally speaking, my presence is the discriminative stimuli or cue for staff to behave in a manner consistent with intervention implementation.

This research study showed that professional development and training are related to implementation. This indicated that school personnel who attend autism specific workshops are more likely to use evidence-based interventions then those who do not receive such training. It is possible that these professionals ascribe to the lifelong learner mentality, and as educational practices change over time, teachers and psychologists seek out trainings to stay current in their profession. School districts may be taking a more active role in bringing relevant professional development training opportunities to their staff. This is a positive finding, as its shows that workshop attendees are not only retaining what they have learned, but are applying it in the very schools they work in. The old platitude that staff are not paying attention during professional development appears to have been invalidated. This suggests that professional development can be targeted directly to increase implementation habits in this area.

As part of a comprehensive behavioral service program, professional development should be used in conjunction with consultation. Staff development workshops are the foundation, and provide the consultant the opportunity to address the school team as a whole. Winning the acceptance of the masses and generating social validity, as explained in the literature will increase the likelihood that the new innovation will become adopted (Callahan, Hensen, & Cowan, 2008; Domitrovich, et al., 2008). This professional development should consist of an overview of evidence-based intervention strategies, step by step instruction, and opportunities to demonstrate the newly learned skills. Subsequent consultation should follow to support implementation on the individual classroom level and address teacher specific concerns or questions.

The school characteristic conditions were excluded from analysis based on the preanalysis correlation matrix, however upon visual inspection, it was quite apparent that an inclusive orientation was the dominant orientation. The data was comprised of 58% inclusive, 11% exclusive, 17% bureaucratic, and 14% adhocratic. More than half of the respondents characterized their school as inclusive. These results suggest the importance of future research focusing solely on the effects of administrative orientation on implementation practices.

The school climate condition was excluded from analysis during the stepwise data entry for the multiple regression analyses, as it was determined through SPSS that it was not significantly related to implementation frequency or duration. Findings from this study suggest that the internal individual characteristics of the professional are of greater influence of implementation behaviors than the external environment. The organizational

health inventory score, a multidimensional composite reflecting the overall health of the school environment that the professional is working in, had a mean of $\bar{X} = 504$, which is considered average. A school with average health is one in which teachers and administrators share a positive relationship, mutual needs are met, and appropriate resources are available. The seven dimensions include institutional integrity, collegial leadership, consideration, principal influence, resource support, teacher affiliation, and academic influence.

The present results were also in line with current literature on training to enhance evidence-based practice . They add to the body of autism education research, by demonstrating that with support and training, special education teachers and school psychologists can be successful in adopting innovative strategies and implementing evidence-based interventions at the middle school level. This is a small step in the right direction for autism education illustrating that it is possible, that school personnel maybe more equip themselves to educate students with autism in in-district placements (Morrier, Hess, & Heflin, 2011; Sansosti & Sansosti, 2013) .

Second, the present research validates the use of consultation and professional development as a means of supporting the educational needs of students with autism. It justifies the need for resource allocation to consultation and training. Budgets are tight, school administrators should want to maximize the return on their investments, and incorporating consultation and professional development into their programs may do just that. Special education classrooms and skills programs can be developed in the general education public school setting, with training and consultation. Maintaining these

students in-district with the necessary supports will not only save districts hundreds of thousands of dollars in private school tuition, but will satisfy regulations specific to placement in the Least Restrictive Environment, and offer greater opportunities for autistic students to integrate with nondisabled peers.

Limitations

A poor survey return rate negatively affected the external validity of the study. The small pool of respondents is not likely representative of the larger population of certified special education teachers and certified school psychologists. Subsequently these findings cannot be generalized far beyond the scope of this study's sample. There are a number of theoretical explanations for the poor return, including survey methods being known for yielding low rates, and the time of year it was mailed out (i.e., July); while school personnel were on their summer break.

Recommendations for Future Research

The majority of recommendations for future research emerged from the results and limitations of this study. First and foremost purchasing the list of prospective respondents from a list service is not recommended as there were 100+ surveys that were undeliverable and marked 'return to sender' having never made it to a recipient. Second, a stronger design method is recommended as the return rates for a paper questionnaire were too poor to yield meaningful statistical inferences. Third, fewer predictor variables are recommended, as seven was overambitious. Fourth, perhaps the professionals degree of training on evidence-based interventions may be an additional predictor variable worthy of consideration, and may account for more of the variance. Lastly, instead of asking for

respondents to provide responses to frequency and duration in a continuous format, narrowing their response to predefined ranges or fixed numbers is recommended to avoid the problem of excessive outliers skewing the data.

Consultation was identified as being a predictor of implementation, future research may seek to examine the type of consultation provided, and how it is relates to evidence-based practice implementation. Consultation can be accomplished in group and individual orientation, as well as synchronous and asynchronous methods. The consultation style may also warrant further exploration, effects of consultee-centered versus consultant-centered. The consultation frequency or credentials of the autism expert may also impact the relatedness to implementation behavior. Professional development was also identified as being a greater predictor of implementation, future research may look to examine the specifics of effective training and professional development as it pertains to evidence-based intervention implementation. Professional development logistics including frequency, group size, credentials or expertise of the speaker may also warrant further investigation.

Implications

The results of this research study suggest that resources specific to consultation and professional development may predict implementation frequency and duration of evidence-based interventions. A better understanding of these factors may open a dialogue among school professionals about the use of evidence-based interventions in their own schools, focusing on more target specific ways to better meet the educational needs of students with autism. Looking at special education from a different perspective,

perhaps one that is more proactive and integrative. Administrators may consider investing in comprehensive educational and behavioral programs that focus on supporting staff and students alike through consultation and professional development. This may lead to more opportunities for students with autism to attend their home public schools, and integrate with typical peers. All of these small changes can cause a ripple effect, positively impacting the life of a child, and the community in which he or she resides.

Conclusions

Overall the results of this study are promising, and are in line with current special education literature on evidence-based practice implementation. Based on these survey results consultation and professional development have been identified as predictors of evidence-based intervention implementation frequency and duration. The exact nature of the association requires further investigatory research, and cannot be determined by this study alone. These findings support the notion that teachers and psychologists may adapt innovative interventions to support students with autism in the public middle school setting. That school personnel are not only absorbing new knowledge imparted on them during training seminars, but grasping the information with sufficient understanding and self-confidence to apply it in the classroom**.**

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Appendix A: Informed Consent

Title: Examining School Culture & Resources As Predictors of Evidence-Based Intervention

Principal Investigator: Cassandra Martinez, LMSW, BCBA

Introduction:

You have been invited to complete this study because you are identified as a Special Education Teacher or Certified School Psychologist. Please read this consent form, complete both sides of the survey/question sheet, and return in the self-addressed and stamped envelope. This form is to provide you with information to help you determine whether or not to participate. It is entirely your choice, and you may choose not to participate. If you decide to take part, you can change your mind later on without penalty. You may retain the copy of this consent for your records.

Study Overview

The purpose of this study is to examine impediments to the practice and implementation of evidence-based autism interventions in the school setting. The impediments under examination are resources and school culture.

Procedures

- The procedure involves filling out a survey and brief questionnaire that will take approximately 15 minutes. Your responses will be confidential, and we do not ask for any identifying information such as your name, school, or address. You will not be contacted by the principal investigator at anytime. The survey questions

will be about your use of evidence-based practice, and the characteristics of your school setting.

Risks or discomfort

There are no identified risks associated with participation in this survey. If at any time you feel uncomfortable answering a question you may skip it or with draw your participation. Should you elect to skip any of the questions your scores will not be counted towards the results.

Confidentiality

I will not be collecting any identifying information about you at anytime. Data will be stored and maintained in a locked file cabinet. Access to the information gathered will be restricted to me and Walden committee members. The results will be used for educational purposes and shared with university faculty.

Contact Information

If you have any questions about the study, please contact Cassandra Martinez at Cassandra.martinez@waldenu.edu, or the Committee Chairperson Dr. Gerald Fuller at Gerald.Fuller@waldenu.edu. If you have any questions about your rights as a participant you can contact the Walden Representative at (612-312-1210)**.** This research has been reviewed and approved by the IRB to ensure it meets the standards for research involving human participants. The IRB approval # is 07-17-14-0283619.

In order to protect your privacy no signatures are being collected and your return of the completed survey would indicate your consent, if you choose to participate

Appendix B: OHI-M

Retrieved from http://www.waynekhoy.com/ohi-m.html

OHI-M(©2003)

Directions: The following are statements about your school, Please indicate the extent to which each statement characterizes your school from rarely occurs to very frequently occurs.	Rarely Occurs	Sometimes Occurs	Often Occurs	Very Frequently Occurs
1. The principal explores all sides of topics and admits that other options exist.	1	2	3	4
2. Students make provisions to acquire extra help from teachers.	1	2	3	4
3. The principal gets what he or she asks for from superiors.	1	2	3	4
4. The principal discusses classroom issues with teachers.	1	2	3	4
5. The principal accepts questions without appearing to snub or quash the teacher.	1	2	3	4
6. Extra materials are available if requested.	1	2	3	4
7. Students neglect to complete homework.	1	2	3	4
8. The school is vulnerable to outside pressures.	1	2	3	4
9. The principal is able to influence the actions of his or her Superiors	1	2	3	4
10. The principal treats all faculty members as his or her equal.	1	2	3	4
11. Teachers are provided with adequate materials for their Classrooms	1	2	3	4
12. Teachers in this school like each other.	1	2	3	4

13. Community demands are accepted even when they are not consistent with the educational program.	1	2	3	4
14. The principal lets faculty know what is expected of them.	1	2	3	4
15. Teachers receive necessary classroom supplies.	1	2	3	4
16. Students respect others who get good grades.	1	2	3	4
17. Good grades are important to the students of this school	1	2	3	4
18. Teachers feel pressure from the community.	1	2	3	4
19. The principal's recommendations are given serious consideration by his or her superiors.	1	2	3	4
20. Supplementary materials are available for classroom use	1	2	3	4
21. Teachers exhibit friendliness to each other.	1	2	3	4
22. Students seek extra work so they can get good grades	1	2	3	4
23. Select citizen groups are influential with the board.	1	2	3	4
24. The principal looks out for the personal welfare of faculty members	1	2	3	4
25. The school is open to the whims of the public	1	2	3	4
26. A few vocal parents can change school policy.	1	2	3	4
27. Students try hard to improve on previous work.	1	2	3	4
28. Teachers accomplish their jobs with enthusiasm.	1	2	3	4
29. The learning environment is orderly and serious.	1	2	3	4
30. The principal is friendly and approachable.	1	2	3	4
31. Teachers show commitment to their students	1	2	3	4

32. Teachers are indifferent to each other	1	2	3	4
33. Teachers are protected from unreasonable community and parental demands.	1	2	3	4
34. The principal is able to work well with the superintendent.	1	2	3	4
35. The principal is willing to make changes	1	2	3	4
36. Teachers have access to needed instructional materials	1	2	3	4
37. Teachers in this school are cool and aloof to each other.	1	2	3	4
38. Teachers in this school believe that their students have the ability to achieve academically.	1	2	3	4
39. The principal is understanding when personal concerns cause teachers to arrive late or leave early.	1	2	3	4
40. Our school gets its fair share of resources from the district.	1	2	3	4
41. The principal is rebuffed by the superintendent.	1	2	3	4
42. Teachers volunteer to help each other.	1	2	3	4
43. The principal is effective in securing the superintendent's approval for new programs or activities.	1	2	3	4
44. Academically oriented students in this school are ridiculed by their peers.	1	2	3	4
45. Teachers do favors for each other.	1	2	3	4

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Appendix C: Question Sheet

Please complete both sides of the survey/question sheet and return in the self-addressed and stamped envelope.

1. Are you a special education teacher or certified school psychologist currently working in a public middle school setting with autistic students? _____
2. How many hours of autism specific continuing education/professional development have you completed this academic year?_____
3. How many hours of expert autism consultation do you receive monthly? _____
4. What is the weekly frequency (i.e., number of days) in which you engage in evidence-based practice (i.e., proactive antecedent-based intervention's, behavior-based focusing on the antecedent-behavior-consequence contingency, applied behavior analytic instructional practices including discrete trial teaching, incidental teaching, errorless teaching, shaping, modeling, and naturalistic teaching (The National Autism Center, 2011)? _____
5. What is the weekly duration of time that you spend engaging in evidence-based practice implementation (i.e., number of hours)?_____
6. Please classify the school in which you serve autistic middle school students as one of the following by placing an "x" on the line:

   _____**0 inclusive** (positive attitudes and acceptance is held for students with autism, and I feel that there is administrative support for special education programs within the general education school)

_____**1 exclusive** (negative attitudes are held toward the special education department and isolation is felt)

_____**2 bureaucratic** (characterized by the institution of policies and practices in place to direct the use of evidence-based autism practices

_____**3 adhocratic** (administration seeks to problem-solve the challenges of educating and managing autistic children in a more reactive fashion, with an emphasis on new ideas).

Participants who wish to learn of the study results may email Cassandra.martinez@waldenu.edu on or after December 2015. Should you have any questions about your rights as a participant in this study please contact the Walden Research Department Representative at (612-312-1210).

Appendix D: Permission Letter to MGI Lists, Media Services Division of Marketing General Incorporated

MGI, Media Services Division of Marketing

cbrecht@mgilists.com

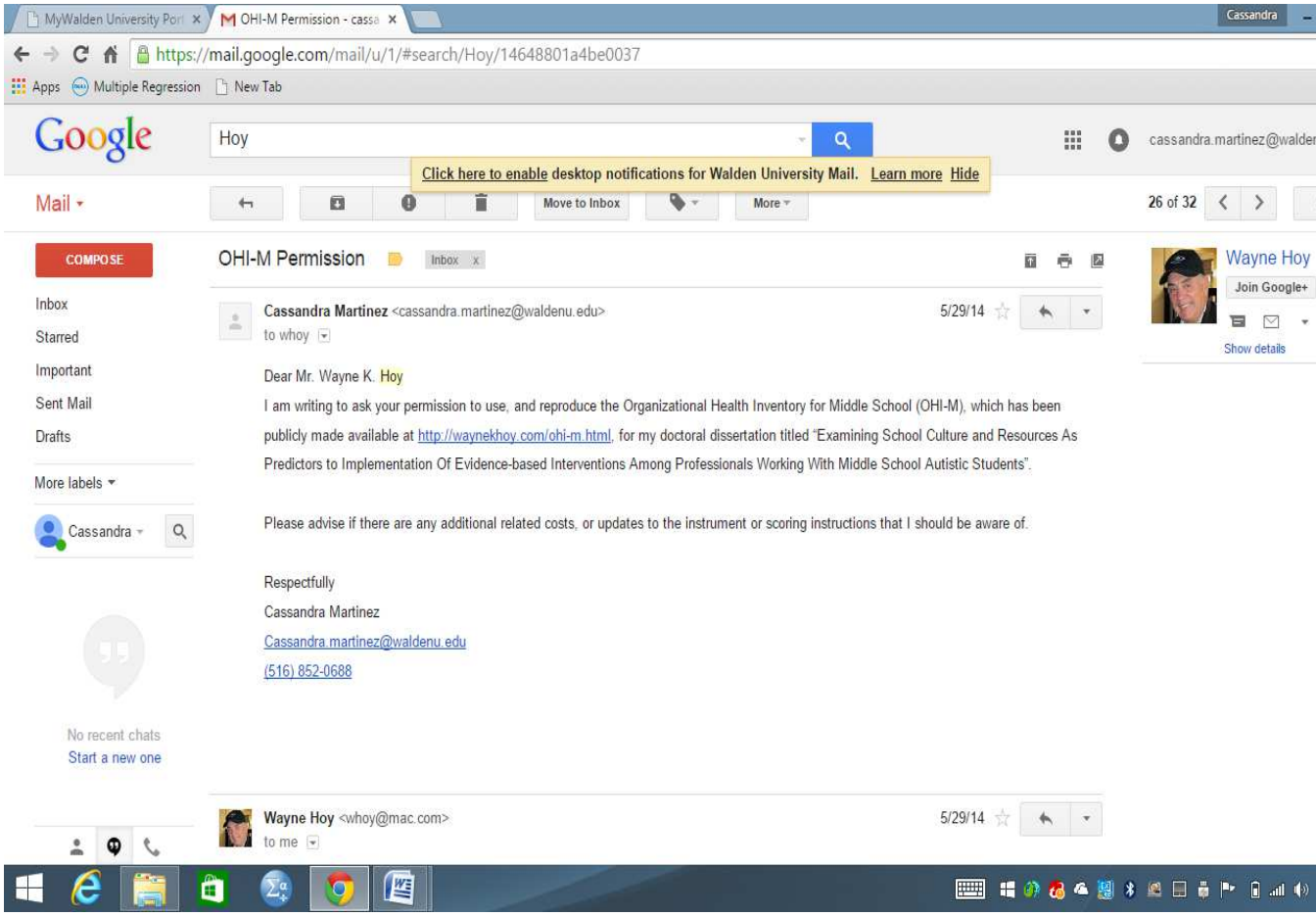
Dear Ms. Candy Brecht:

I am writing to request permission to rent the mailing list you maintain for the Council on Exceptional Children. I would like to select those contacts for members who service individuals with autism and developmental disabilities, and those identified with middle school age children. Can you please advise me on the costs and how to proceed with placing this order.

Sincerely

Cassandra Martinez

Appendix E: Permission Letter to Instrument Copyright Holder



Appendix F: Permission Letter Received From Copyright holder